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Radio Control CAR ACTION

THE WORLD'S PREMIER R/C CAR MAGAZINE

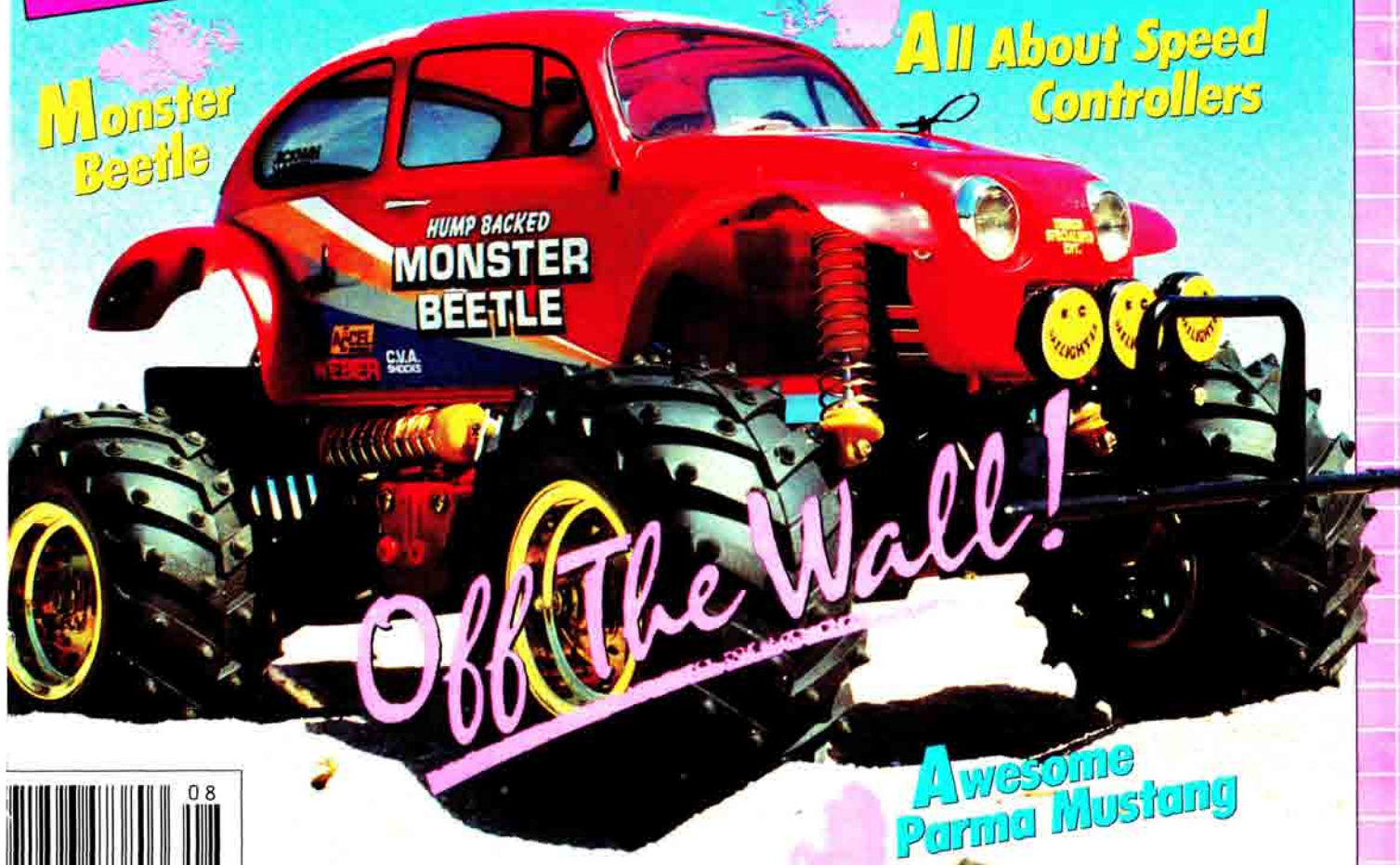


Pulsar
Radio



Grand National
Stocker

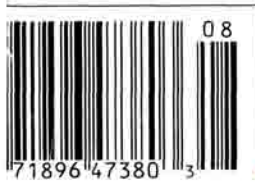
Monster
Beetle



All About Speed
Controllers

Off The Wall!

Awesome
Parma Mustang



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Cover: Another R/C blitz greets you this month, headed by the new Monster Beetle from MRC/Tamiya, photo by Louis V. DeFrancesco Jr. and story on p. 20. Next is the slick, scale-like 1/10 Grand National stock car photographed by Rich Hemstreet, story on p. 52. The latest radio from Kyosho will zap control into your latest R/C project, photo by Arce Studios and story on p. 42.

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EDITORIAL

by LOUIS V. DeFRANCESCO JR. JR.

ANOTHER BLINDING issue's in store for you! The newest, hottest, biggest, and baddest—it's all here. We can barely keep up. There are new

products and changes happening within the hobby by the minute!

Note that in this issue we have a feature article on an awesome track and stock car event that was held at Lake Whippoorwill, Florida. Now this is no ordinary R/C track. This is an authentic, paved, scaled-down version of the one the big boys like Bobby Allison and Al Unser drive on. Super-professional tracks like this are beginning to spring up throughout the country and will give the hobby even more exposure, not to mention the attractive prize money that we might be seeing shortly for the racers. These mini-super speedways have really moved 1/10-scale stock cars into the limelight and might even some day eclipse the popularity of the off-landers. There is a serious move-

ment toward scale R/C stock cars developing right at this moment.

The new 1/24-scale Tamtech cars from MRC/Tamiya are yet another unprecedented development for

R/C. These neat little cars are super fast and can be run anywhere, including your living room! Don't be surprised if these mini-missiles start a new trend of racing.

One review you won't

want to miss is the new Mini Mustang from Parma. We've been racing this state-of-the-art ballistic machine and the results are staggering. When it shifts into high gear (two-speed transmission!) it's a sight to see and you'll be hearing more about this new 1/10-scale contender.

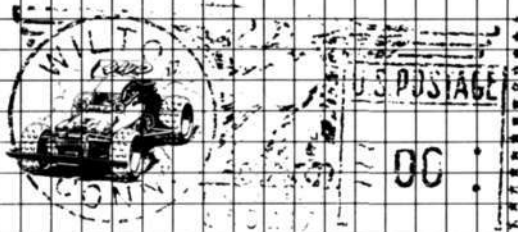
We feel we have put together quite an impressive issue for you once again—dramatic color photos, "How To" articles, Track Reports, and more. Keep all the letters and comments flying in and enjoy.

Radical!



Your editor-at-large Chris Chianelli, left, and, on the right, publisher Louis V. DeFrancesco, Jr. letting you know who's number one.

Letters



R.O.A.R. Rebuttal

The following letters have been received in response to the letter we printed in the June '87 issue by Mr. Anthony Lubrano entitled "R.O.A.R.?" The letter seems to be quite controversial, but may I remind the readers and advertisers that our "Letters" column is a forum for views and ideas—a place where people in the R/C modeling community can be heard. It also does not necessarily reflect the views and ideas of this magazine. We apologize to anyone who may have misunderstood our intent, and we are happy to grant equal space for other opinions.

LVD

As a part of R.O.A.R. that has no ties or connections to any manufacturers, I feel that I have the right to be heard too! I read the letter you received from Mr. Lubrano and can understand the concern of a person who is not very well informed.

R.O.A.R. has been a major force in R/C racing for almost 20 years. They are one of the forces responsible for making the sport the great success that it is today. As with any sport or hobby that's as large as R/C car racing, there must be rules and approved equipment.

As for the motors that R.O.A.R. approves, they too must meet certain requirements *before* they even go to the approval committee. These people have their ethics and honor to uphold. Before a motor goes to the board, proof of its availability to at least five national distributors is necessary. This way, they can be made available to *every* retailer who carries R/C cars and parts, not just to a monopoly of a select few.

As for the manufacturers that are not on these boards and hold jobs for R.O.A.R., they satisfy the need for familiarity with the product, as well as the technical expertise to perform the duties which they were voted upon to do. If R/C racing is as serious to Mr. Lubrano as it seems, what's the gripe? Let the pro's do

what they know best!

The assault on the integrity of Mr. Ernie Provetti holding the position of Chairman of the Motor Approval Committee is invalid. It would be difficult to find a better candidate for this "high-tech" position. He is a motor manufacturer with the knowledge necessary to evaluate and establish acceptable lines for motor approval. Don't believe for even one minute that his motors are not torn down, tested, and scrutinized when they finish in the top positions at a regional or national event.

Pro Class is an idea which R.O.A.R. has been working on for some time now, headway is being made, and there's a 50/50 chance of its approval. Factory and team drivers may receive better motors, batteries, and parts than the average racer. Is that anything that should upset anyone? Put yourself in their place. If you were a manufacturer of a fine R/C product and one of the best drivers in the world drove for you, wouldn't you make sure of the quality of the parts he raced with?

As for the approval boards and R.O.A.R. officials, *we are all volunteers!* We receive no pay and donate our time, our talents, and our expertise freely.

I love R/C racing, but I want to do it right! R.O.A.R. was, and still is, the only place for me.

DON LOONEY

R.O.A.R. National Club Director

I feel Mr. Lubrano's letter in the June issue of *Radio Control Car Action*, in which he attacks the credibility of R.O.A.R., requires a response. Mr. Lubrano must be a newcomer to the sport, or he would know that it was R.O.A.R. that started organized competition, and that it's R.O.A.R. who has helped the sport grow from its beginning in 1969 to the present. R.O.A.R. is a volunteer organization, which means that all the officers and officials donate

their time to help our sport. They deserve a lot of credit, not ridicule.

Mr. Lubrano resents the fact that Ernie Provetti, a motor manufacturer, was Chairman of the Motor Committee. The object here is to get as many motor manufacturers who are willing to be on the Motor Committee as possible. There are motor rules and regulations published by R.O.A.R. which must be adhered to before a motor can be legalized. Who's better qualified to judge if a motor meets the legal specs than the motor manufacturers? They're certainly watching out so that no one gets an unfair advantage over anybody else.

When a new motor is submitted to the Motor Committee for approval, it's tested, and only if found legal is it sent on to the Product Approval Committee for final approval. There are five people on the Product Approval Committee, only two of which are manufacturers.

Mr. Lubrano also gave a sly remark about the fact that most of the racers in the winner's circle are industry sponsored, and the reason for their winning is because they get motors that no one else can. Apparently Mr. Lubrano hasn't figured out why the same racers are in the winner's circle in the stock motor classes, where the motors are registered and handed to the racers by the race directors. Thus Mr. Lubrano would be receiving the exact same motor as everyone else, and apparently he's still losing! He should give a little more credit to his fellow racers' driving ability, car preparation, and dedication to success.

Oh, by the way, I wonder if Mr. Lubrano knows that the President of R.O.A.R. is a motor manufacturer, and that he was voted into office by the members of R.O.A.R. He was voted in again for a second term by those same members. Maybe R.O.A.R. members know something that Mr. Lubrano doesn't.

GENE HUSTING

R.O.A.R. Member No. 1102

We welcome your comments, and suggestions. Letters should be addressed to "Letters," **Radio Control Car Action**, 632 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and length. We regret that due to the tremendous amount of letters we receive we cannot respond to every one.

Frisky Frog

I'd like to say just one thing. Awesome! My dad and I love R/C cars. We first bought an MRC/Tamiya Frog and recently I got an MRC Blackfoot. We have our Frog geared down as low as the kit allows, but would like the Frog to travel at about the same speed as the Blackfoot. Are there any gear reduction kits available for the Frog which will help us out?

JASON KOLPIN
Butte, MT

Jason, the Blackfoot and the Frog use the identical differential as you already know. Check out the adjustable motor mount from CRP used in Project Frog Part II in the June '87 issue. This mount allows for down-sizing pinion gears for the low-end you need.

FM

Drive 'em Crazy

First of all, congrats on the best R/C car mag around! It's great that you're going bimonthly now. I'm 25 and my brother is 36, and we're just getting into R/C cars and love 'em. And it's all your fault!

We picked up your Fall '86 issue at a friend's house and immediately lost our minds! We were always aware of R/C cars but we had never realized the possibilities. My brother bought a Grasshopper and Parma's '33 Ford body. It's too bad that Parma or BoLink doesn't make a '68 SS Camaro body. Old Camaro's are really popular, and it would look real trick sitting next to BoLink's '66 fastback Mustang. Both me and my brother hope that it's just a matter of time. Keep up the good work, we need that *Radio Control Car Action* fix!

ALAN MORRIS
Bloomington, IL

Alan, I'm glad we're to blame for your R/C psychoses! BoLink has a '67 Camaro and Parma has just introduced a '69 1/10-scale Camaro. Although they're not

'68s like the one you mentioned, I'm sure they'll look just as trick sitting next to the Mustang.

CC

Stock-up, Stars and Stripes

Congratulations on your fine magazine, it seems to just keep getting better and better with each issue. In fact, I'm going to break down and buy myself a subscription. I don't want to miss a single issue, which wouldn't be too hard to do here in the United Kingdom.

I'm a U.S. serviceman stationed at RAF Lakenheath, and the only source for your magazine is our "Stars and Stripes" bookstore here on base. Once each new issue of *Radio Control Car Action* hits the stand, it disappears in a couple of days. I've just finished building my very first competition car, the Kyosho Turbo Optima, and will be racing it with a club in the area. I'm really looking forward to getting back in the good old US of A and getting involved even more in the R/C car hobby.

I would love to see an article on the growing 1/4-scale side of the sport. I think they're wild! Keep up the good work on your magazine and you'll put the British mags to shame.

WAYNE M. HALL, TSGT, USAF
RAF Lakenheath, U.K.

It's always great to hear from one of our guys overseas, especially when he's enjoying a little R&R with R/C cars. When you get back home, check out our track directory for tracks around your home town. At the rate this hobby is growing, I'm sure there'll be even more great places to race.

CC

More Gas

First off let me state that you have a great magazine. It's been over a year since I began reading your magazine, and at first I thought that it was just a passing thing, but lately I've begun to realize that in your magazine there's an

extreme lack of variety regarding the engine review articles. Here are a few examples: Summer '86 featured the O.S. Max 21 VF-B, Spring '86 the O.S. Max 21 FSR-B. Then, in the February '87 issue the O.S. Max CZ-1 was the feature. Another redundancy was with the Winter '87 issue, where the Super Tigre S-21 Buggy R.S. was the feature, followed by April '87, and another Super Tigre, this time the S-21 Buggy.

To me, all these reviews seem a bit one-sided, since out of five articles only two different manufacturers were discussed.

In addition, I feel that there's an overabundance of articles pertaining to the electric R/C crowd, since it's more popular than gas. The gas R/C folks, of which I happen to be one, don't ever seem to get a fair shake. I have written to other magazines including R.O.A.R., stating these various problems which we gas R/C people face, but I've never gotten a reply, and don't expect one from you folks. But maybe, just maybe, someone out there will lend a hand and help me with this problem. I'm sure a whole bunch of people would appreciate it.

DON WALKER
Buena Park, CA

Don, I'm sorry no one has addressed your complaint until this time. You're correct in pointing out that electrics are more popular than gas, but I'm not sure you understand as to just what degree. An extremely conservative estimate is that 85% to 90% of all R/C cars sold happen to be electric. I like the gas cars myself, but both of us must accept the fact that the editorial content of a magazine must reflect the concerns of its widest audience if it's going to be a success. The engines we have covered are some of the more affordable and popular ones. However, we will be featuring more high-performance engines and cars in the future as time and space constraints allow.

CC



The Inside Scoop

by CHRIS CHIANELLI

THE R/C car industry is in a fast-pace state of advancement with new products being offered at a head-spinning rate. The number of choices from entry level to all-out competition equipment is ever-increasing. In light of this phenomenon, I'll make the manufacturers nervous and you R/C squirrels who are hungry for info happy by bringing you a special report on security leaks and "late-in" items in the new "Inside Scoop."



JUST IN! Du-Mor R/C of Cinnaminson, New Jersey, is now going to be the U.S. distributor for the internationally renowned 1/12-scale on-road Corally. This is a multi-surface, adaptable road car that's been dominating the European circuit. Wait for a full-blown report.

* * *

SPEAKING OF 1/12-scale on-road, Varicom has decided to import the Mugen Tempest. This high-tech car has been running the circuit in Japan for some time with much success.

* * *

ATENTION MONSTER Mud Mashers! Kyosho will be introducing the all-new Big Brute. I'm sure this new truck will feature the high-quality and well-thought-out engineering that's become synonymous with the name Kyosho.

* * *

RUMOR HAS IT that BoLink will be offering a

new off-road rear suspension kit for their sprint car for those of you wishing to convert your flat-track sprint for rougher surfaces. BoLink is not the type to be left behind in the body business, and will be offering a '57 T-Bird, a March 86-C Indy car, and a Lamborghini Countach all in 1/10-scale. I saw these at the WRAM show and they are very scale in appearance.

* * *



NATIONWIDE, 1/4-scale racing has been growing, and 1/4-scale drag racing is right in the middle of this growth. In Buffalo, Texas, Performance Drag Products has a 1/4-scale top-fuel dragster which they bill as the "world's fastest top-fuel dragster." It even has a nitrous oxide system on board to insure its claim to fame. Stay tuned.

* * *



NOW THAT I have the attention of you octane animals, it's only appropriate to mention Raco's new 1/4-scale '87 T-Bird. Watch for it!

* * *

WCM OF BUFFALO, Texas, is coming out with a 1/4-scale Pro-Stocker with a Camaro, or possibly a T-Bird body. Features will include a three-speed transmission and a quick-change rear-end—get the bleach ready!

* * *

FLASH! Parma gives you the willies. That's right, a '41 Willy's coupe, one of the



most sought-after classic street-rod subjects ever. Also new from the prolific body boys in Ohio are a 1/12-scale

Lola, BMW Indy cars, a 1/10-scale '27 Ford "T" Roadster, a Lexan Blackfoot body, built with permission. And get this, a 1/10-scale chopped and channeled '49 Mercury, a favorite of yours truly.

* * *

DID YOU EVER want to find something special for your car but didn't know where to find it? *The Radio Control Car Action 1988 Buyer's Guide* will be a colossal source for all the information you need. Check your local newsstand and this magazine for its October availability.

* * *

MRP HAS JUST finalized production and release of the GP-10. It was scheduled for early April release but production delays moved that date up. It looks hot!

* * *

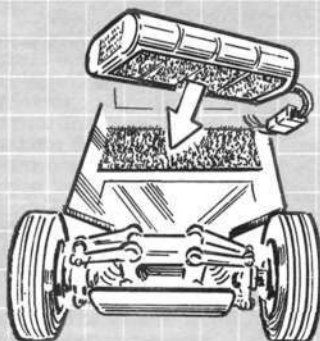
CUSTOM WORKS R/C is introducing an exciting 4WD racing machine. Watch out for this one. (Does the name Landgraaf ring a bell?)

* * *

Keeping the industry BUGGED, I'll see you next time—or sooner, if I catch you in my spyglass! CC

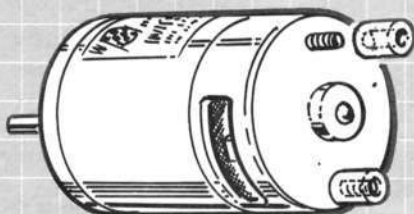
Pit Tips

by JIM NEWMAN



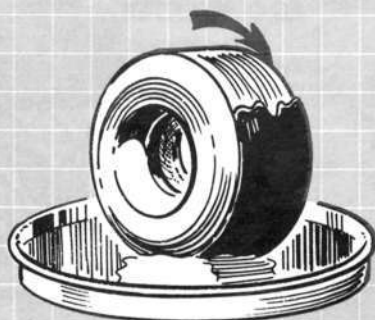
This contributor finds it far more convenient to mount his battery packs on Velcro strips to facilitate quick changes "in the field." The sketch tells all.

Jason McClure, Gresham, Oregon



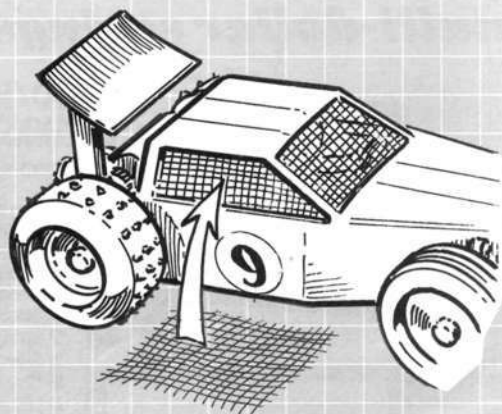
Finding the exposed threads holding the endbells of his low-mounted motor were consistently being damaged, this driver solved the problem by slipping tight-fitting pieces of plastic tubing over each protruding bolt head.

Steve Marshall, Brigham City, Utah



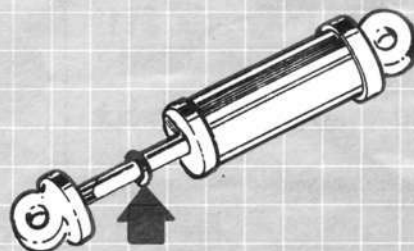
Have any old, bald tires that are too thin for racing? Give them new life for just messing around by rolling them in a small tray of Genie-Dip or Color Guard, used for coating the handles of pliers, etc., and available from your hardware store. Does a fine job of retreading!

Josh Quarles, Kansas City, Missouri



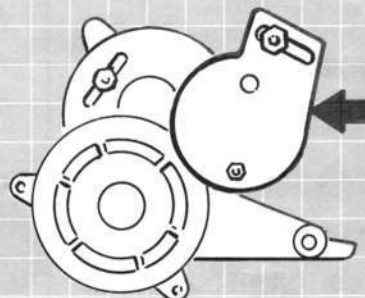
Most off-road cars have no window glazing and this encourages entry of gravel, etc. Obtain some mesh from window screen or onion or potato bags and glue this in place. Your columnist found a discarded table tennis net that would also suit the purpose. Once in place, this looks very life-like.

Travis Rikansrud, Canton, South Dakota



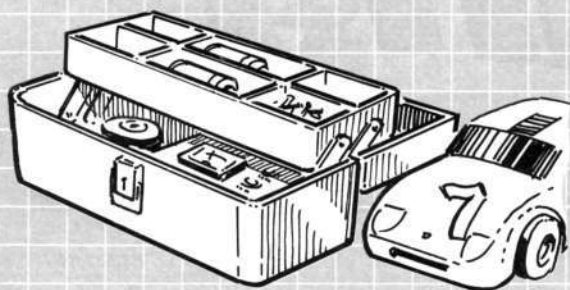
Need to check out how much suspension travel you're using up? Is it too soft or too hard? Place a small O-ring on your shock strut piston rod and slide it to the bottom. After practice, check the position of the O-ring. If it has been pushed all the way up to the top, the suspension unit is too soft. If it has hardly moved, it is too hard. Do what you have to in order to rectify the situation.

Scott Grabau, Wausau, Wisconsin



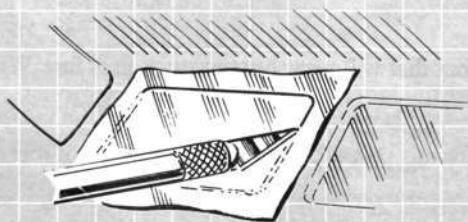
A drawback of the MRC/Tamiya Hornet is the inability to change pinion gear ratios. CRP offers an adjustable motor mount for the Frog which works well on the Hornet without modification. Using the mount allows pinion ratios to be varied.

Damon Bottorff, Denton, Texas



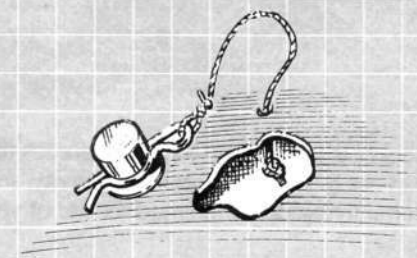
Need an inexpensive field box—especially attractive to beginners? Your local dime store should have neat and very useful plastic fishing tackle boxes with swing-out trays in which you can store and sort all kinds of useful stuff, with room for charger and sandwiches in the bottom!

Baxter Lusink, Hampton, Virginia



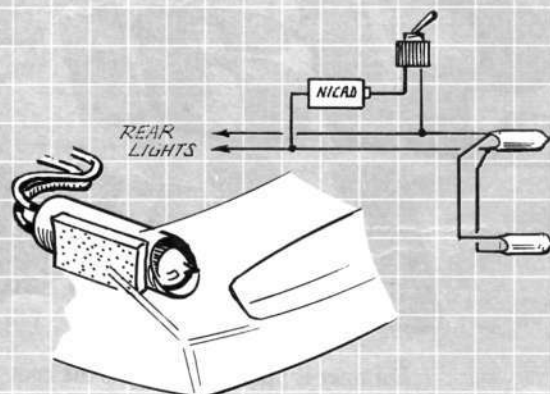
When masking for painting the inside of your new bodywork, use adhesive shelf paper to mask out the window areas. A good brand for this purpose is Contact A-20, which has a light tack and can be lifted and repositioned if required. Even after burnishing down it is easily peeled after painting.

Ray Earp, Danville, Virginia



So many drivers seem to be losing their bodywork clips, yet the answer is so simple! Tie a fine nylon or Dacron thread to each clip, then tie the thread to any convenient chassis or suspension member. Alternately, drill a very small hole in the body, then knot the thread inside the body near the clip.

Benjamin Notaro Jr., Vineland, New Jersey



Want to run at night? Go to Radio Shack and ask for Mini Lamps, 6-volt, 60-mA—they come in red, yellow, and green. Drill out the bodywork, glue in a drinking straw or other suitable plastic tube, and insert lamps with a small dab of silicon glue to hold. Keep vinegar-smelling glue off copper wires—it will eat them! Foam tape with double-stick will also hold tube in place against body side. Wire to Ni-Cd through a small switch, or use a separate Ni-Cd.

Jeremy Alinder, Maplewood, Minnesota



Have you stripped out the thread in your plastic car chassis? Using a larger screw is likely to crack out a large piece of the molding, so this racer recommends his method. Inject a few drops of cyanoacrylate glue into the hole, then wiggle a toothpick around in there to coat the walls of the hole. When the glue has cured—and not before—reinsert the screw and you'll find it is once again tight and can be securely torqued.

Howard Beringer, Mystic, Connecticut

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o **Radio Control Car Action**, 632 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO, AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

The Starting Line

by the RADIO CONTROL CAR ACTION Staff

Summer is upon us, and so is the heat. There's no relief in sight as we burn up the track and turf with the technological wonders we call R/C cars. Your questions have been making the postal delivery service a little slower by such a deluge of mail, which we're really enjoying!

Let's take a look at tires, that mysterious mating of car to road. In the meantime, send your comments and suggestions to "The Starting Line," c/o *Radio Control Car Action*, 632 Danbury Rd., Wilton, CT 06897.

Q.

I want to run my off-road car on asphalt instead of dirt, but that will wear out the stock tires fast. Where can I get road tires?

A.

Many of the aftermarket manufacturers make tires just for this purpose. However, this does not mean you can just bolt on the tires and go.

Q.

What do you mean?

A.

The most important thing after mounting the tires is to adjust the suspension. In off-road use, we allow the suspension to be a bit "mushy" so the tires can bite into the dirt and absorb shocks. On the road, the suspension should be set for a little more firmness so that the chassis won't sway to the side too much and flip over on a turn.

Q.

That doesn't sound too rough, right?

A.

It takes some time to get it right, just as it does for real pro stocker teams that go through rigorous tuning to get their cars to match the track. Remember that an off-road car has a higher center of gravity, so it can't match the performance of a regular street racer, but it certainly "widens" the road for use of your car.

Q.

Are there tires specifically for use in sand?

A.

A choice of many "old timers" is the paddle tire. If you've ever seen sand dragsters, that's exactly the kind of tire they use.

Q.

What about "regular dirt"?

A.

The tire that came with the car might just be okay but I've heard that the V-spike tire is a hot seller. Obviously, the V paddles grab loose dirt while the spikes grab the harder stuff.

Q. Do you believe there are really dual-purpose tires for on- and off-road use?

A. Some have been made, but you'll find they're a compromise. Take a look at MRC/Tamiya's Porche 959: the tires work best in the dirt but they offer a reasonable grip on asphalt.

Q. Are sponge tires good for off-road cars?

A. Generally speaking, no. The torque required to move off-road cars usually is enough to rip chunks off of spongies.

Q. Why are sponge tires so good for road cars, then?

A. First, the road is smoother; second, there is less sidewall flex so the forces are fed back to the suspension to be handled; third, road cars are designed with a lower center of gravity and less ground clearance so the sponge tire has to be firmer to support the car. And finally, sponge grips asphalt best!

Q. Are there instances where sponge doesn't work for road cars?

A. If you race on very slick surfaces such as linoleum, or polished wood floors as in a gymnasium, semipneumatic rubber tires do work better. In some cases, "tire goop" is necessary to provide maximum grab.

Q. What's "tire goop"?

A. That's a compound you can put on the tire to increase a tire's adhesion. In the early days of slot car racing, wintergreen oil was used. We'll never forget the aroma of those tracks!

Q. Why are there different compounds of sponge tires for gas cars?

A. This is where our hobby closely parallels real life. We've seen tires made for light chassis, heavy chassis, oily tracks, dry tracks, bumpy tracks and super-slick tracks. All these varieties assure that our cars get the best handling in any condition.

Q. How should I choose a front end tire?

A. That's a great place to start to improve a car's handling. Does your car have a lot of front end slide? A knobby or spiked tire will give you extra grab.

Q. What if the front end grabs too much in a turn?

A. Then a straight ribbed tire will give you a bit of slip yet give you great control on the straights.

Q. Are hubs an important part of the tire setup?

A. Yes and no. A good hub holds the tire; a bad one doesn't. But looks are important only to the beholder, a chromed hub doesn't make your car any faster.

Q. Are metal rims better for cars?

A. If you're racing, we feel that this is one area where metal rims excel.

Q. Why are metal rims important only in racing?

A. In racing, if you don't finish, you can't win. While plastic rims do not actually break, they can chip on the sides and lead to the shredding of the rubber. Metal rims resist this chipping.

Q. Are there other advantages to metal rims?

A. Metal is heavier than plastic, so it acts as a flywheel to keep the car on an even keel. It also acts to absorb the power from a motor smoothly. Yes, they also look great!

Q. How can I make my tires last longer?

A. Wow. The question of the year.... There's actually no set answer to this one, except, don't abuse your tires! Don't run off-road tires on asphalt and road tires on dirt. Don't allow tires to keep water inside the rim; dry them off quickly. Sunlight also breaks down tire compounds, so don't leave them out in the outside.

Q. What's better, wide or thin tires?

A. Once again, there's no simple answer. For example, when off-road cars were in their infancy, a funny thing happened. The Tamiya cars such as the Super Champ and Sand Scorcher had good rubber, but then the Holiday Buggy was introduced with its narrow spiked rear tires. The racing crowd grabbed some Holiday Buggy tires and called them the greatest. Currently, tires are wider but our motors have improved and now have better low-end torque (true for both gas and electric engines) so they can move a greater area of rubber more quickly.

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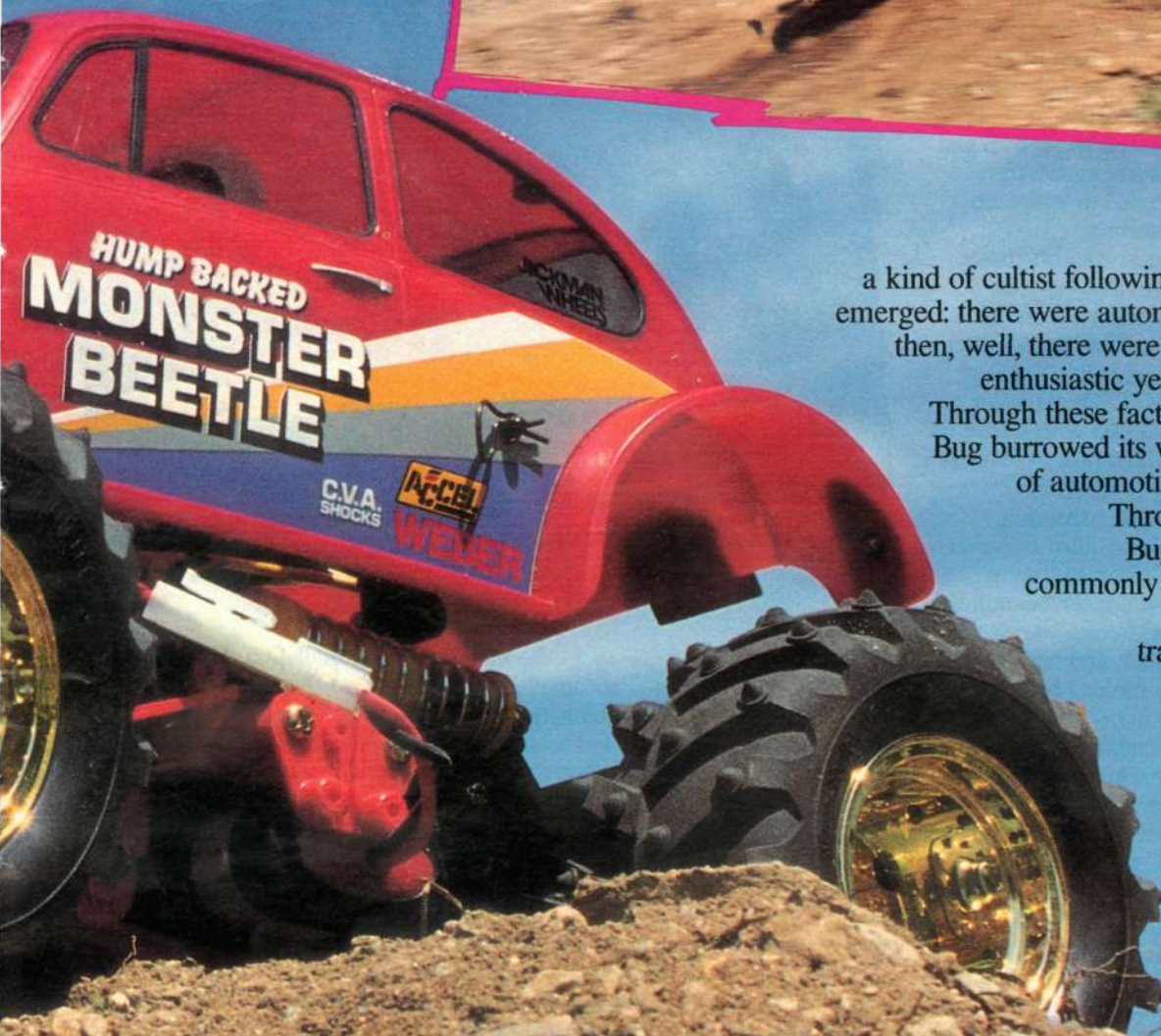
by STEVE POND

BACK IN 1949, when the first Volkswagen "Bugs" rolled off the production line, most Americans looked upon the WW II-era design as an incongruity to the styles of the day, to say the least. Although the car offered simplicity and efficiency in the shape of an egg, most Americans were accustomed to driving larger cars with all the Detroit options framed with swirling, gleaming chrome. The Bug, despite its humble economy, just didn't make sense. However, the Bug had much to gain over its shaky debut, and eventually whistled its way into the hearts of many, and even inspired



Track Report

color photos by STEVE POND



a kind of cultist following. A phenomenon emerged: there were automobile owners and then, well, there were "Bug" owners, an enthusiastic yet curious minority. Through these factious followers, the Bug burrowed its way into the pages of automotive history.

Through the years, the Bug, or Beetle as it is commonly called, hasn't only been used for transportation, but it has been transformed into some rather interesting means of



photo sequence by STEVE POND

MONSTER BEETLE

recreation, too. Some of the Bug's latest off-shoots include trikes using the VW engine, dune buggies using the VW chassis, and the most popular of them all—the Baja Bug, utilizing the VW body and chassis with some modification to accommodate larger tires and increased suspension travel that's needed to withstand off-road terrain.

The latest spin-off comes in the form of a 1/10-scale R/C off-roader, much like a Baja Bug, called the Monster Beetle from MRC/Tamiya*.

THE KIT. The Monster Beetle is a two-wheel-drive off-roader with a host of features including four-wheel-independent suspension, adjustable oil-filled coil-over shocks, ABS-resin frame, 130mm-diameter, beautifully plated gold-color wheels, RS-540S motor, and one of the most detailed injection-molded bodies I've ever seen.

Other items that you'll need to get the Monster Beetle running are a 7.2- or 6-volt rechargeable battery pack, a slow or quick charger, and a normal or BEC two-channel R/C system on a surface frequency. For the Monster Beetle, I used the MRC two-channel, two-stick R/C system. This system includes servo-reversing switches, charging jack for optional Ni-Cd battery charging, and last but not least, two high-power servos. As far as miscellaneous tools are concerned, there are a few of these you'll have to supply, too. Included in the kit are a box wrench, switch lubricant, grease, Allen key, and nylon zip-ties. The items you must provide are a large and medium Phillips screwdriver, needle-nose pliers, side cutters, X-Acto knife, and thread-locking compound. To detail the body, you'll need some paint (colors are included in the instruction manual) and a paint brush.

CONSTRUCTION. For these instructions to be any clearer, MRC would have to include a video follow-up! The construction process for the Monster Beetle is very similar to that of the Blackfoot; the chassis of both vehicles are virtually identical. The only recommendation I have regarding the Monster Beetle is to break-in



Monster Beetle includes oil-filled shocks all the way around. Note chassis members same as Blackfoot and Frog.

the motor prior to installation. This is accomplished by taping two D-cell batteries together (just as they would go in a flashlight) and connecting the motor leads to either end of the battery stick. Be careful to get the correct polarity so that the motor breaks-in running in the same direction it turns to propel the car forward. During the break-in process it is wise to apply some commutator oil where the brushes contact the commutator and also in the bearings. By breaking-in the motor, it will allow more of the brush to contact the commutator, eventually allowing for longer run times, lower motor heat, and longer motor life.

Once the chassis is finished, it's time to detail the body. Because the Monster Beetle has an injection-molded body, it isn't necessary to paint the entire body. I only did the detail work and applied the decals—and it looks monstrous, un-Beetle-ble even.

PERFORMANCE. Although this isn't the car I'd enter in the ROAR Nationals, I have more fun with it than all of my other cars bumper to bumper; it gives a change of pace.

After completing all the qualifying heats at the local track, I gave the Beetle a fresh charge and went at the track with wreckless abandon. A

(Continued on page 82)

Track Report

MRC/TAMIYA Tamtech

*1/24-scale road machines—could start
a whole new dimension of R/C racing!*

by RICH HEMSTREET

THE
last
time I
built a
1/24-

scale race car, it had a guide pin hanging down from the front of the car, to go into a slot in the track. If your slot followed the outside of a turn, that was where your car went. Not any more: the new 1/24-scale MRC/Tamiya* Tamtech car is fully radio controlled. I have seen videos of a group of these cars, racing on an old commercial slot car track. The first driver to a turn gets the best line, just as in real racing.

THE KIT. The complete Tamtech kit includes a Tamtech 201 radio unit, a special 7.2-volt battery pack and trickle charger. My kit included the Lancia LC2 endurance racer. A Porsche 962C is the other body style available. The only thing you have to add to the kit is eight AA batteries for the radio transmitter.

The kit includes a specially designed steering servo and a Control Processing Receiver (C.P.R.) unit that acts both as a receiver and a fully proportional speed controller. The radio system is built by Futaba but sold under the Tamtech label.

The rear pod is attached with parallel links on the top and an A-arm with a ball connector on the bottom. There is a coil spring built-in along with a stabilizer bar. The Mini Black Motor drives the car through a geared type differential. The front suspension features independent coil springs.

CONSTRUCTION. The Tamtech car goes together very easily. The only problem was that the parts were awful small for my big, clumsy fingers to handle. It takes 3 hours to trickle



LANCIA

charge the 7.2-volt 270 mAh battery pack. Start charging the pack right away, so you don't have to wait so long after putting the car together to run it.

The radio system fits neatly into the plastic monocoque chassis. The rear suspension is hung on the rear of the chassis after the rest of the car is ready to go.

In all, it takes about 1 hour to build the car. The body is a clear, hard styrene plastic. It is very well detailed, but it is a bit heavy. The body has to be painted on the outside, which means the paint won't hold up as well as with Lexan bodies. The decals that came with the car were a major disappointment. They were the old-fashioned, water-dip

style and couldn't handle the high relief details of the body. Tamiya's peel-and-stick decals for 1/12- and 1/10-scale cars are such high quality that the comparison increased my dissatisfaction with these. On top of that, the decals don't hold up to any racing abuse.

PERFORMANCE. Wow! This little car really moves! The Mini Black Motor is really hot. You can choose from four pinion gears to suit your race track. The car does have an annoying amount of oversteer. The twin-stick Tamtech 201 radio transmitter doesn't provide any way to dial out the steering. I did install a set of Twinn-K #9788 high-performance tires that helped a little. Finally, I put some tire dope on the rear tires and that gave me controllable handling.

By switching to a Futaba Magnum Jr., I was able to dial out the steering. The Futaba 27 MHz crystals are used in the



Tamtech system.

The Lancia runs 15 to 20 minutes on one charge. There is an optional quick charger available.

The 1/24-scale Tamtech cars open up a whole new area of racing. These cars can be raced in the house on a recreation room floor. I have seen 1/24-scale stock car bodies mounted on a Tamtech car. You could hold the Daytona 500 in your basement. It might be good to provide a slightly less powerful motor for racing in close quarters.

Finally, I'd like to see Tamiya switch to Lexan bodies to save weight and help the paint stay on. This is a durable car that could introduce a lot of people to radio-control racing.



Above: High-quality Tamtech radio was specially designed for intended use. Left: Tamtech smoking down the straightaway.

*The following are the addresses of the companies mentioned in this article:
MRC/Tamiya, 2,500 Woodbridge Ave., Edison, NJ 08817.

Twinn-K Inc., P.O. Box 31228, Indianapolis, IN 46231. ■

Track Report

1/10-Scale Quarter-mile Missile!



Pro Stock

by RICH HEMSTREET

AS THE CHRISTMAS TREE counts down...yellow...the driver tenses up...yellow...ready to go...green! The Pro Stock explodes off the line, gaining speed all the way down the strip and across the finish line. Here is a 1/10-scale Pro Stock by Advance Engineering*. Their latest addition to the Dragin cars.



THE KIT. The Pro Stock shares a common frame and rear axle/motor support with the 1/12-scale Funny Car kit. The wheelbase has been stretched and the track widened. The front crossbar is a stretched version of the Delta spring front with fully adjustable caster. My kit was the basic one that required radio, motor and electrics. I used the KO Propo EX-5 Radio from Hobby Shack* with standard-size servos. A BoLink* rheostat speed control was used. For the motor, I used the Kyosho 240S from Great Planes*.

The car uses 1/8-scale Mini Mags on the rear to mount the large Grand Prix tires. Up front, a narrow Mini Mag is used to mount a ribbed front tire.

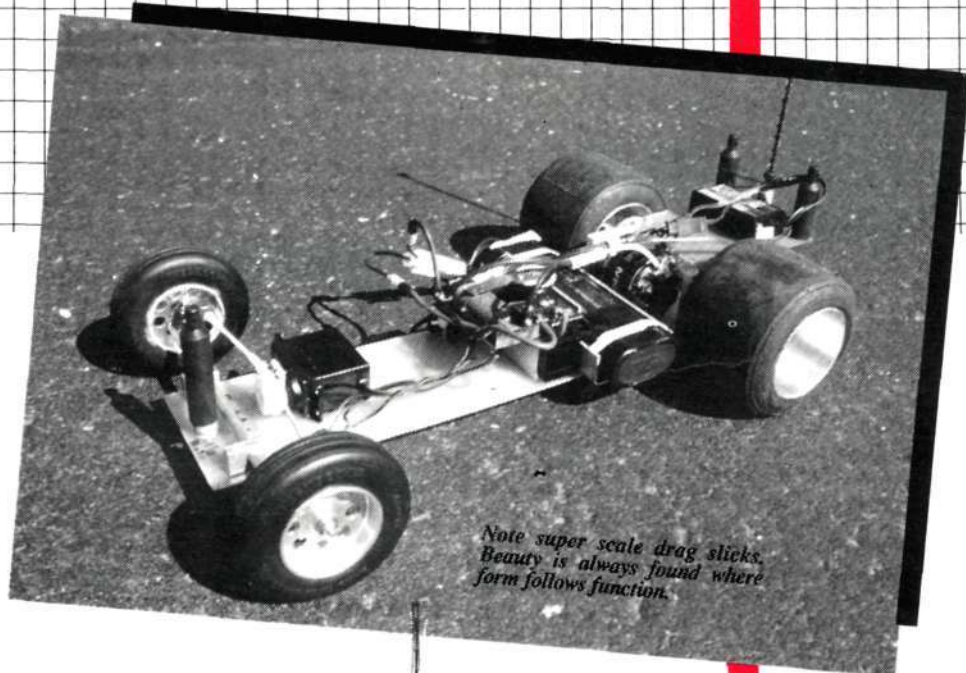
The car comes with a clear, '87 T-Bird body kit by BoLink. *Radio Control Car Action's* airbrush specialist, Phil Sroka, did a beautiful rendition of Bob Glidden's winning Pro Stock car.

CONSTRUCTION. The kit is very easy to build. The car uses a straight axle setup; no need for a differential on the dragstrip. Be sure to make a flat spot on the axle to prevent the spur gear hub from slipping under acceleration. I installed the receiver and antenna on the rear body mount support, behind the rear axle.

The Grand Prix tires look huge on a 1/10-scale car. Be sure to clean the inside of the tires thoroughly before mounting them. Use FLEX-ZAP by Pacer* to glue the tires to the mags.

PERFORMANCE. The KO radio has many adjustments for end points on the steering, throttle, reverse and brakes. Dial all of the steering control out of the car. You don't want to over-correct the steering at high speeds. The car will tend to go straight if you set the caster at about 20°. The ribbed front tires add to the stability of the car.

I geared the Kyosho 240S at 14/48 with a 6-cell battery pack; the motor accelerated smoothly down the 132-foot-long dragstrip, and was clocked at 4.19 seconds for the 1/10-scale quarter mile. Bob Glidden would flip out if his T-Bird was that quick in the quarter.



Note super scale drag slicks. Beauty is always found where form follows function.



KO radios are making quite a name for themselves in many types of racing.

The Dragin Pro Stock is a lot of fun. The car is so simple that it lends itself to experimentation, like when I burned out the rheostat with a 13-cell battery pack.

Next time I think I'll try just 10 cells.

**The following are the addresses of the companies mentioned in this article:*

Advance Engineering, 180 S. Highway 67, P.O. Box 766, Woodland Park, CO 80866.

Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92728.

BoLink R/C Cars, 420 Hosea Rd., Lawrenceville, GA 30245.

Great Planes Model Distributors Co., P.O. Box 4021, Champaign, IL 61820.

Pacer Tech, 1600 Dell Ave., Campbell, CA 95008. ■

Race Strategy

by DICK BRINTON



The never-ending game of "Who's setting up whom?"

IN THIS ISSUE, we'll work on passing in heavy traffic and sizing up the competition.

Passing cars successfully in heavy traffic isn't luck. We've all seen drivers that seem to breeze through the jams that collect other drivers and sometimes their moves are so smooth, it looks like magic.

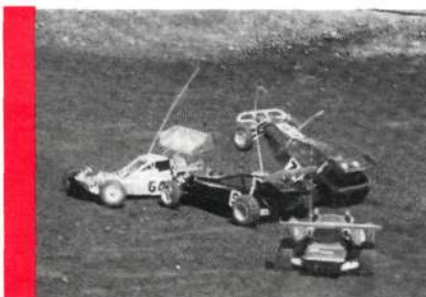
The drivers that can do this consistently know their competition and plan ahead. They don't just storm up on a clot of cars and blunder through—and we can't either, not if we want to win with any frequency.

Have you ever noticed that some drivers tend to lose their concentration when they get close to other cars? Or how about the fact that some cars seem to be highly magnetic? That is, they crash into and hold any car that gets near them. It's also true that some drivers just can't maintain a good line through a turn or keep a straight line down the straights.

In order to do well in your class, you should be familiar with the other cars you race against. It won't take long for you to get to know which are the quick ones and which are not. But it takes a little more observation to learn enough to help you pass a particular one in a race.

It's always a good idea to observe your competition whenever possible. If your class is large enough to have an A, B, or C

heat, take the time to watch the heats you aren't involved in. Identify various cars and remember how they're being driven.



Beware! The lead car can bring many others down with it.

It can also help to walk around the pits and take a look at the cars in your class.

Fix in your mind what you observe. For

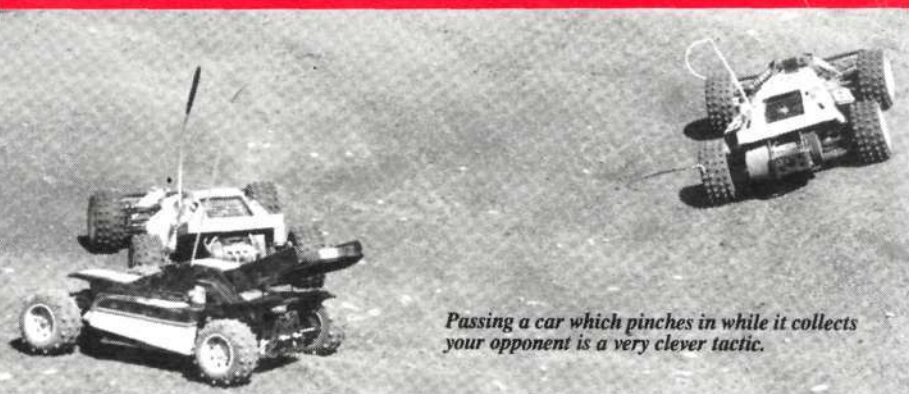
instance: if you see a blue car with a white stripe being driven wildly, you might stick it in your mind by thinking of it as the "blue skunk," a car you want to give a lot of room. Or you might note a green car running a very predictable line and think of it as "green for go," a car that may be easier to pass—or might present some serious competition.

Most of the time, you will know the drivers you race with regularly. Try not to think of the particular drivers but rather of the cars and the way they are being driven. I know this sounds strange, but in the heat of competition, it's very easy to get confused. Your friend Bill, who is usually a good driver, may be having an off day, or his car may be set-up poorly for track conditions. You'll pick this up quickly if you watch his car being driven without thinking about who's driving it.

Don't get psyched out because Bill is usually fast. This is your day!

Let's look at a typical track problem. You got hit on the start and you're running fourth or fifth behind a group of cars that are all trying for first place. It's early in the race but someone is breathing down your neck. In your efforts to stay ahead of this person and gain lost ground, you're reeling in the car immediately in front of you. What is the best passing strategy?

That depends on your knowledge of how the cars in front and behind you are being driven.

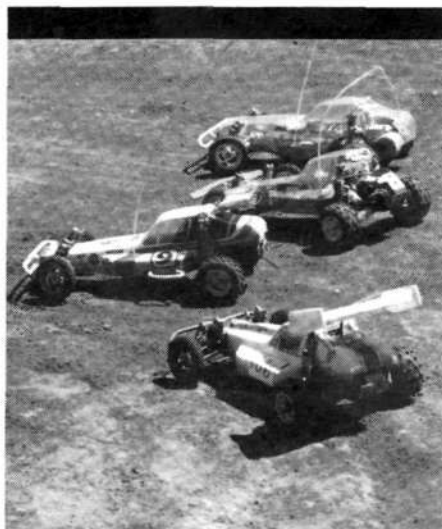


Passing a car which pinches in while it collects your opponent is a very clever tactic.

Let's say you recognize that the "blue skunk's" up front and the car right behind you is "green for go." Right away you know that "blue skunk" may take you out of the race if you don't make a clean, fast pass. You also know that if you dog it or he delays you, "green for go" will be alongside you in no time.

Why not get "green for go" to help you get around the "blue skunk"? No, you can't ask green if he'll ram into blue to let you get by. But you can set up your pass so that the "blue skunk" will be occupied with "green for go."

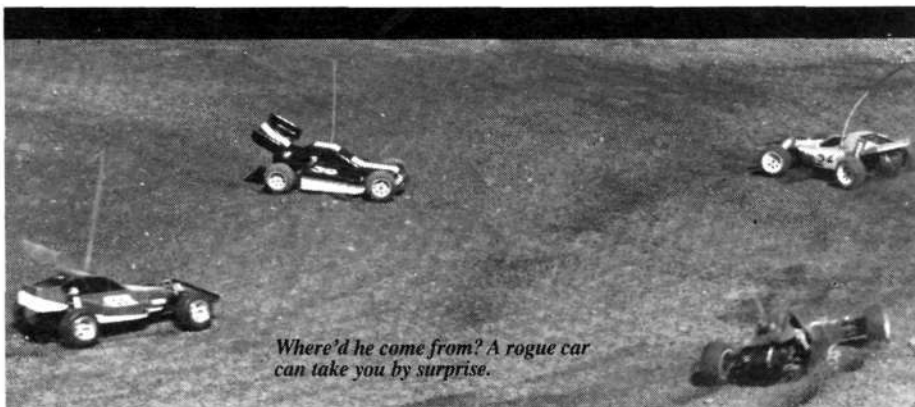
Ever notice that when a driver is setting up a pass on the inside of a turn, the drivers being passed seem to always pinch in toward the inside? Sometimes, though, a driver will get nervous when about to be passed, and will hit a turn too hot and slide wide, thereby opening up a



Braking finesse can win you the inside line in a crowded situation.

big passing lane. This is when your observations become important. Is the driver of "blue skunk" one who pinches in or one who slides wide?

If blue tends to pinch in, run up behind him and use the inside line of the turn. He will pinch in to try to block you, which is just what you want him to do. Wait until green gets up close to you then set up your pass. As soon as blue pinches in, usually at the beginning of the turn, swing wide and pass on the outside. You'll be clear in the outside lane and green, trying to pass you, will dive for the inside of the turn just



Where'd he come from? A rogue car can take you by surprise.

about the time blue gets there. If you've done it right, you'll get by and the other two cars will tangle or slow each other so you can gain some space.

If blue tends to over-cook the turns when pressed, do just the opposite. Start on the outside, hit the brakes carefully just a bit before entering the turn, dive for the inside and exit under power. Green may follow you but at least you'll be by blue and moving quickly.

When you get the timing down so you can pull this off, it will be very hard to hide your grin. Plus all your friends will want to know what mods you've done to your car to make it so fast.

Obviously, you can't do any of the foregoing if you haven't done your homework as mentioned at the beginning of this article. And you can't pull it off if you can't see.

As you know, I've harped on wide-angle vision a lot in earlier articles in this series. But, if you've been practicing, by now you should be able to size up a car running in front or behind you even when they are quite a few car lengths away. When you add this to your observations of other cars in your class, you've got a powerful pair of tools to help you take the checkered flag.

While we're talking about passing, remember you'll turn faster lap times if you use brakes (not reverse). You can go deeper into the turns with brakes and also you will be able to get back on the throttle sooner. If two similar cars take the identical line through a turn but one gets back on the throttle before the other does, the one that gets on the power quicker will attain a higher speed on the straight following the turn—if traction, etc., is the

same. So get in the habit of using your brakes to slow your car for tight turns and get back on the throttle as soon as you can.

For this to work well, you'll have to set your brakes so they slow your car—but not so much that they stop the rear wheels or worse, spin them in reverse. This will cause a severe loss of traction and you'll spin like a top.

You'll also need to work on the throttle control so you can feed-in the power. If your control is one of the Off/On variety—it goes from off to high throttle without hardly any step in-between—you'll do better on the track by switching to one of the variable resistor types.



Airbrakes?

In this series of four articles, I've attempted to provide information that will help get you into the winner's circle. To get the most from the series, you should read the articles in order, since each connects to the one before. If you're missing an issue, just check the ad index of this issue to find the Back Issues order form. There's lots of good stuff coming in future issues!

Dick Brinton, c/o Radio Control Car Action, 632 Danbury Rd., Wilton, CT 06897. ■

Track Report

P

A

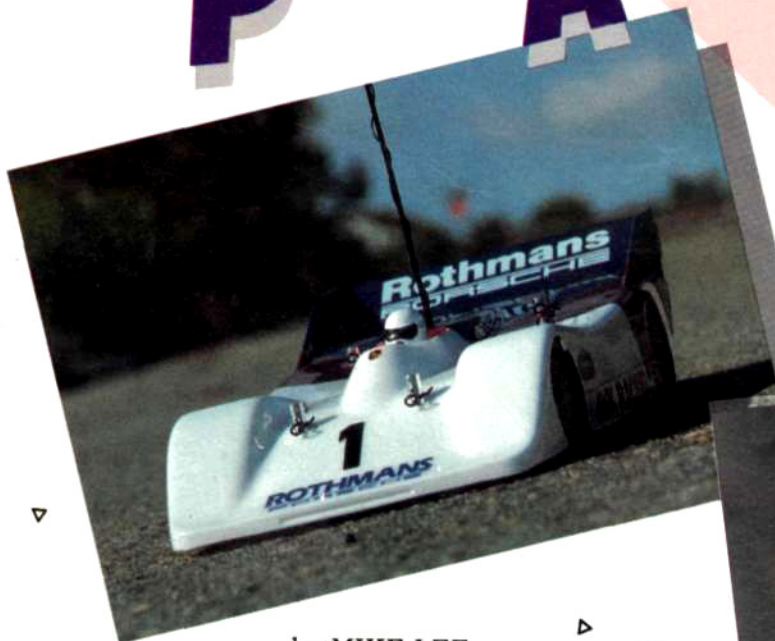
R

AYK

S

from Race Prep

Carbon-fiber chassis and full-floating rear pod, this one into the winner's circle.



by MIKE LEE

IN ROAD RACING, there are several things which make a car competitive. One is speed. Others are light weight and handling. These ingredients make the difference between being among the front runners and being an "also ran." This review deals with a 1/12 road racer that is unique and has all of the aforementioned criteria for racing. It is the AYK Racing CRX Parsec from Race Prep*.

THE KIT. To round out its reputation as a competitive machine, the Parsec features a four-point oil-dampened suspension, a carbon-fiberglass-reinforced chassis, a full-floating rear pod, an oil-dampened rear end, and a heavy-duty front end.

ASSEMBLY. Construction of the Parsec is quite easy, requiring only two nights to put this serious 1/12-scaler together. I started with the five oil dampeners. The four primary dampeners are used to control the roll and front shock system, and are very small with a total throw of about 5 mm. That's not much, but when the dampener is filled with grease rather than oil, the dampening is effective for road racing. By the way, the kit does say to use grease rather than oil.

The first two dampeners are placed on the front suspension where the front wheels are suspended with lever arms under springs. The lever's inboard end is attached to the dampener, and the system effectively soaks up road bumps.

The front end is mounted onto the chassis via heavy-duty nylon suspension arms, which are hefty enough to withstand many cold shots into the wall without damage. In between the two suspension arms is a large aluminum front chassis member. It's not really a bumper, but heaven help any other

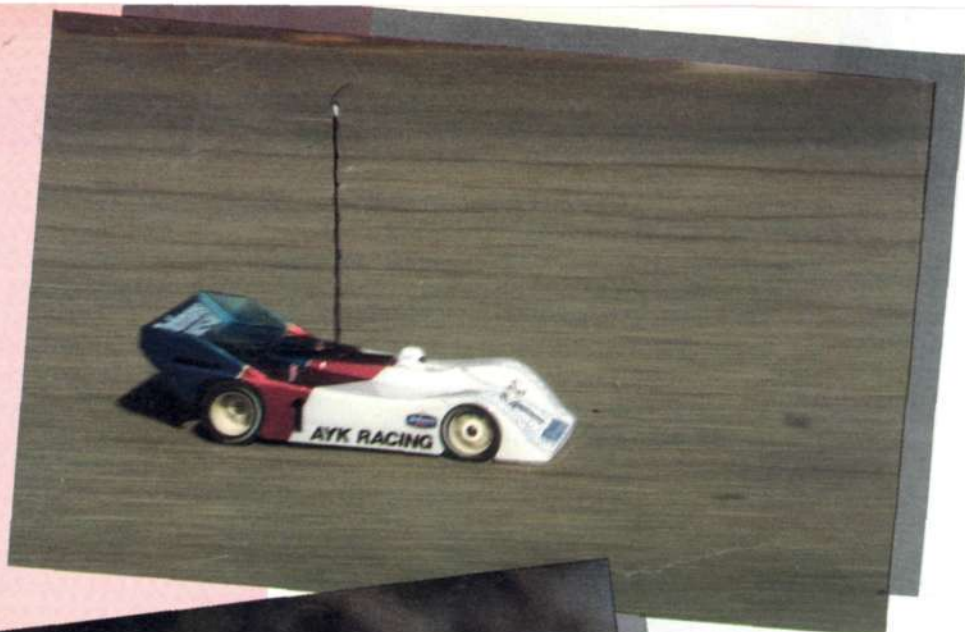


car which comes in contact with it.

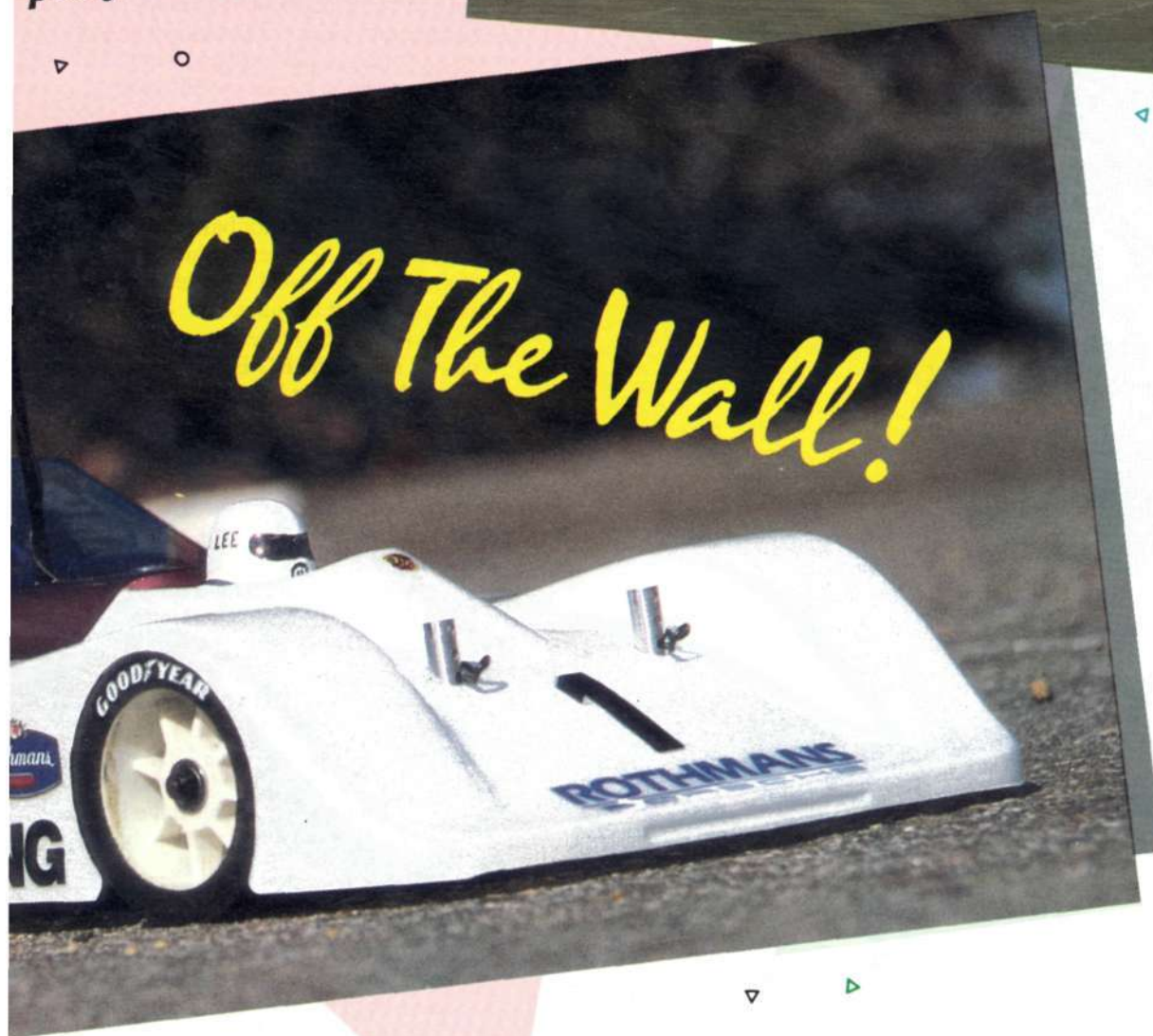
The main chassis is made of carbon-fiber-reinforced fiberglass and, believe me, this is the toughest stuff to hit the track yet. It will last many times longer than standard fiberglass and is stiffer. The upper shaker plate is also made of this material.

At the rear end, a sub-chassis is attached to the main

pod just might launch



Off The Wall!



chassis on top of several spaced mounting screws, which allow some sub-chassis movement. This seems strange until you mount the rear pod containing the motor mount. The rear pod is bolted in place to the sub-chassis and then things are tightened down a bit.

It was then time to mount the upper shaker plate with speed controller. The shaker plate also holds the throttle servo, suspension mounts, and antenna mount. The speed controller is a multi-banded ceramic wire-wound resistor already wired and ready to run from the

factory. In fact, there is a plug on it that will allow use of battery eliminator circuitry, a good idea for road racing. The speed controller has a linear forward response with variable braking, and works well. A copper wiper assembly attaches to the servo for throttle response.

Finishing the shaker plate is installation of the shock mounts and antenna mount. The antenna mount serves double duty in the Parsec, in that the rear monoshock also attaches to it. The antenna itself is one of the nicest I've seen. It's a fiberglass whip antenna that also acts as a roll-

over antenna. If you've ever rolled over a 1/12 car, you know they can be real violent. The use of a roll-over type antenna can keep damage to a minimum while usually putting the car back on its feet.

Now it's back to the rear pod, which gets mated to the shaker plate. The fifth oil-filled shock should be readied with regular oil and mounted to the rear end. This is a spring coil-over shock and provides the main suspension action for the entire rear



Top: Upper shaker plate and anti-roll dampeners control rear suspension. Above: Sophisticated front suspension on the Parsec. Note small but effective grease-filled dampeners.

end. The last two grease-filled dampeners are placed from the shaker plate to the rear motor pod. They act as anti-roll dampeners to prevent hard maneuvering from washing out the rear end and causing a spin. Pretty nifty idea, me thinks.

At the business end of the Parsec is an extremely smooth gear-type differential, with four planetary gears inside. The outer bevel gears also act as dust covers to protect the internal workings. The differential gear is mounted to a carbon fiberglass rear axle.

The wheels supplied in the Parsec kit have nylon rims with medium sponge compound tires. It is here that you find one of the outstanding features of the kit: ball bearings everywhere! All rolling points of the car are mounted on ball bearings, front and rear. This little addition means the difference between fast and real fast!

In the powerplant department, I chose the latest stock class offering from Race Prep, the Race Power Dyno-Tuned motor. This is a strong-running stock motor based on the AYK motor can. Beware, this motor will perform closer to a mild modified motor when you give it the juice.

To guide the Parsec I used one of the newest radios, the KO EX-5 from Hobby Shack*. This little jewel is a full-feature two-channel rig that looks really dynamic. It has servo-reversing, end-point adjustment for both channels, reversing panic switch, steering dual-rate, and a large power meter on the front panel.

I chose the racer's option on the EX-5, providing me with a single standard servo for steering and the CX-IIR reversing electronic speed controller. There's nothing wrong with the Parsec's stock speed controller, but once you try an electronic speed controller like the EX-5's, you get spoiled. The CX-IIR speed controller has full proportional forward with mild brakes and a half-speed reverse. It comes with a little device called the Pulse Checker, which you use to set up the throttle position on the CX-IIR.

The body supplied with the Parsec can be either the Porsche 962C open body or the 962 closed coupe. Both are good looking and very slick. Mine came with the 962 open cockpit version, which I painted with Pactra paints, the R/C Car Racing Finish brand. This paint is outstanding in

color and finish, yet easy to work with.

With a 6-cell battery on board and the EX-5 radio and body mounted, the Parsec weighed in at 33 ounces. Included with the kit is hardware to mount a rear wing, should the need to have one arise. The overall length of the Parsec was 10 inches in the chassis, with a wheelbase of 7.75 inches. The width at the front tires is 6.25 inches and at the rear 6.75 inches. Ground clearance at the rear is .25 inch with stock tires and

(Continued on page 82)

Track Report

REMEMBER THE FABLE about the frog which was transformed into a prince in the June issue? If not, let me refresh your memory. The series began with an innocent MRC/Tamiya* Frog (Part I), which was transformed into a lilly-pad predator (Part II), and now the transformation is complete. Enter one sleek, mean, and handsome prince of an off-road machine.

The "Prince" name comes from Hot Trick Racing Cars* Frog/Red Prince kit. As you'll see in the following conversion, the Frog, which is a fine off-road performer with a few modifications, can be made into a royal prince that's next in line for the throne.

The Hot Trick Racing Frog/Red Prince kit (No. 087) comes with all the components necessary to adapt your Frog. The only major items you'll need are four short RC10 or equivalent shocks. But before the details of the transformation are reviewed, let's take a look at the kit.

ANOTHER EPISODE IN THE
CONTINUING SAGA...

THE RED PRINCE

by FRED MURPHY

addressed this problem with their TriDirComp chassis. TriDirComp stands for, Tri: three, Dir: directional, and Comp: composite. This material is both lighter and stronger than G-10 glass. It also provides the proper amount of flexibility necessary to absorb shock while ridding the chassis of ugly holes and mounting pins. All the Hot Trick chassis come with pre-drilled mounting holes which are countersunk for a clean and professional finish. The chassis kit also includes the rear swing arm and shock-mounting brackets.

The front end unit (No. 064) is the next major component of the Red Prince. Also included in the kit is a steering linkage assembly (No. 065), a speed control/radio tray (No. 066), a suspension lowering kit (No. 067), a body mounting kit (No. 033), and a rear wing mounting bracket (No. 093). The lowering kit and rear wing mounting bracket weren't used.

(Continued on page 104)

PROJECT FROG



photos by LOUIS V. DeFRANCESCO JR.

by CHARLIE KENNEY

THIS MONTH I have a new 1987 car radio to review, the Kyosho Pulsar Pro 2000 from Great Planes Model Distributors*. It has some great features, such as adaptability for either right- or left-handers, adjustable throttle trigger centering, adjustable steering wheel tension, two-channel servo-reversing, and a very unique ergonomic transmitter design which provides centroid balancing for real comfort of handling. The Pulsar Pro 2000 is a pistol-grip radio system specially designed for cars. The experts at Kyosho built the Pulsar from the "ground up" for the model car driver, incorporating great styling and high-tech features at a very low price. The Pulsar 2000 is truly a proportional control system, wherein every movement of the steering wheel is translated into precise, smooth car movement.

The particular system I received was a Pulsar Pro 2000 operating on Channel 62, 75.430 MHz, with flag color blue-red. The system consists of the Pulsar Pro 2000 transmitter, Pulsar KR-2M two-channel receiver, two Pulsar KS-88 servos, a Pulsar battery box with On/Off switch, two spare servo horns, mounting hardware, and a frequency flag. The system is constructed of molded black plastic, and construction and workmanship are top quality. The transmitter is a work of art—when the batteries are loaded, the center of gravity is right at the pistol grip. It is probably the most comfortable transmitter I've used—the all-up weight with batteries (Ni-Cds) is only 1 pound, 4 ounces. All-up weight of the car system is 11 ounces. The KR-2M receiver is one of the smallest receivers I've seen for a car, measuring only $2\frac{1}{16} \times 1\frac{1}{4} \times \frac{3}{4}$ inches and weighing 1 ounce. Rounding out the car system, there are two KS-88 servos. They measure $1\frac{1}{16} \times 1\frac{7}{16} \times \frac{3}{4}$ inches and develop 34 oz-in. of torque.

Let's take a look at the transmitter controls. Starting at the top, you'll find a seven-element telescoping whip antenna measuring 33 inches long. Just in front of the antenna is the

steering trim which is ratcheted and is used to fine-trim the steering wheel control. To the right of the antenna is the transmitter carrying handle which is molded into the transmitter body. Below the handle is the battery/power meter. As long as the needle is in the green, the batteries are okay. As it approaches red, it's time for a change; either replace the dry

Kyosho **PULSAR** PRO 2000

from Great Planes Model Distributors





photos by ACE PHOTOGRAPHERS

Bottom view shows battery pack and partial view of transmitter circuitry.

cells or charge the Ni-Cds if you're using them.

The transmitter charging jack is located on the lower left-hand side of the pistol-grip as you face the transmitter. On the upper left-hand side of the transmitter, about even with the center of the wheel, is the throttle trim control. It is also detented like the steering trim. Commanding the front of the transmitter is the steering wheel, which has a sponge rubber grip for positive control. The wheel moves approximately 30° either side of center. Clock-

wise movement produces a right turn, counterclockwise a left turn.

Below the wheel is the knurled pistol-grip handle which affords positive grip-

TRANSMITTER—PULSAR PRO 2000

Operating System: Pistol-grip with centroid balance and servo reverse.

No. Channels: 2

Modulation: AM

Frequency: 75.430 MHz

Power Requirement: 9.6V Ni-Cd, 12V with 8 alkaline cells

Current Drain: 80 mA at 12 VDC

Dimensions: 5 $\frac{3}{4}$ x9x2 $\frac{3}{4}$ inches

Weight: 1 pound, 4 ounces (Ni-Cd)

Antenna: 7-element telescoping, 33 inches long

RECEIVER—KR-2M

Receiving Frequency: 75.430 MHz

No. Channels: 2

Modulation: AM

IF: 455 KHz

Current Drain: 14 mA at 6V

Size: 2 $\frac{1}{16}$ x1 $\frac{1}{4}$ x $\frac{3}{4}$ inches

Weight: 1 ounce

SERVO—KS-88

Control System: Positive pulse control (1.50 μ s neutral)

Operating Angle: Rotary system, one side 45°

Power Requirement: 6.0V (shared with receiver)

Current Drain: 6.0V, 5 mA (at idle)

Operating Speed: 0.2 sec/45°

Output Torque: 34 oz.-in.

Dimensions: 1 $\frac{9}{16}$ x1 $\frac{7}{16}$ x $\frac{3}{4}$ inches

Weight: 1.6 ounces

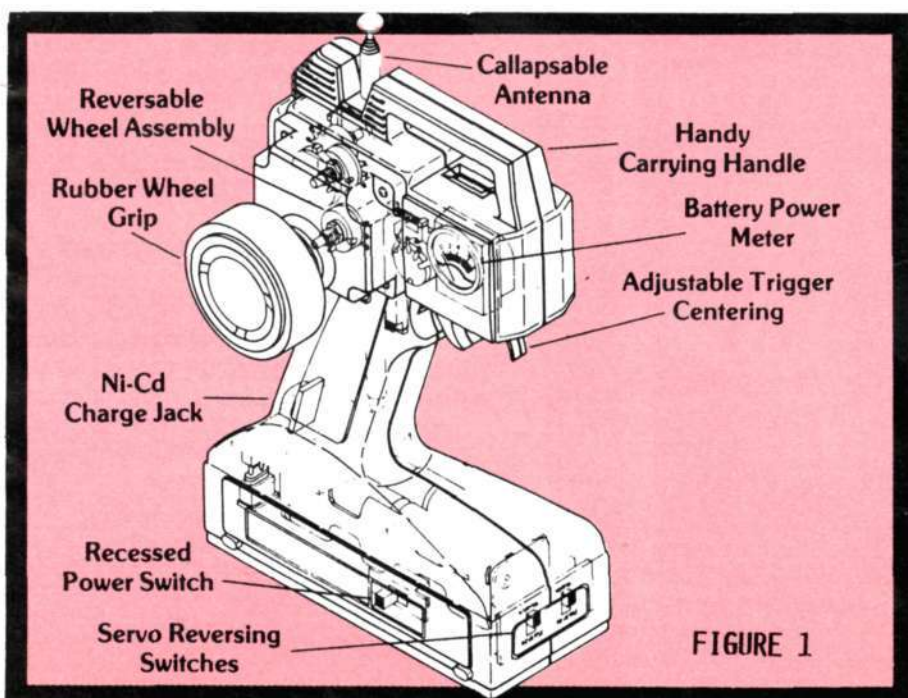
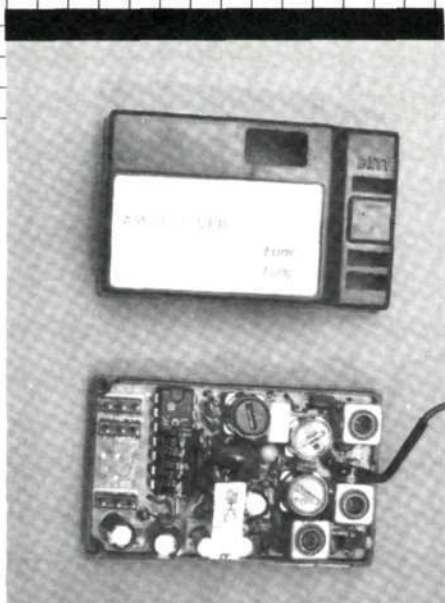


FIGURE 1

ping action and with the low center of gravity makes the transmitter very comfortable to use. If you rotate the transmitter 90° so that you're looking up at the steering wheel, you'll notice a small Phillips-head screw on the right side in a recessed hole. This is the steering wheel tension adjust which allows you to set the "feel" of the wheel. Clockwise movement of the screw provides more drag on the steering wheel (harder to turn) and counterclockwise movement makes the wheel easier to turn. Directly below the wheel is the Throttle Trigger Centering on the knurled handle. This control allows two positions for the trigger neutral. The actual adjustment is on the rear of the handle, although with a proper-width blade screw driver, it could be adjusted from the front. The neutral or horizontal position of the adjustment slot will give both acceleration and braking action by squeezing and moving the trigger forward respectively. When the Throttle Trigger Centering is moved to its other position, the throttle gives full travel.

Moving to the bottom front of the

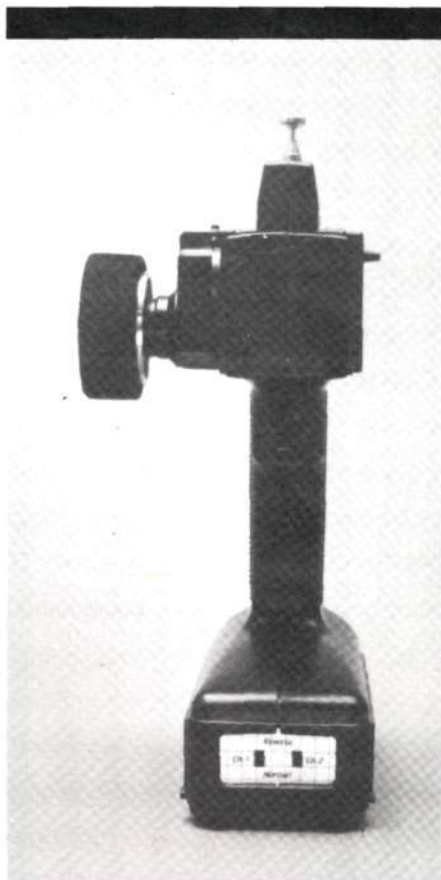


Left: Super compact receiver weighs only 1 ounce. Above: Car unit includes two servos, receiver, battery pack, and switch harness. Weighs 11 ounces.

transmitter you'll find the On/Off switch in a recessed portion of the base. On the bottom right side of the transmitter are the two servo-reversing switches with Channel 1 to the left, Channel 2 to the right. Normal position is with the switches down, reverse is up. Transmitter battery access is achieved by removing the sliding cover on the bottom of the unit. The transmitter crystal is also accessible when the battery cover is removed.

There is one more feature I'd like to cover, namely, the ability to reverse the steering wheel for left- or right-handed modelers. The Pulsar as it is shipped from the factory is for right-handed drivers and the statistics quoted by Kyosho say that one out of ten of the U.S. population is left-handed. Thus, if you are left-handed, you can modify the Pulsar Pro 2000 to a left-hand configuration by the following steps:

1. Make sure the power switch is Off.
2. Using a small Phillips screw driver, remove the four small screws holding the transmitter back plate on (where the channel number decal is). Remove the back plate and place all the parts in a small storage container.
3. Turn the transmitter over and carefully remove the four long screws holding the steering wheel, but do not remove it now.



Right-side view showing servo-reversing switches.

4. Slowly lift the front plate away from the transmitter and unplug the connector from the steering wheel assembly. Move the steering wheel to the other side of the transmitter and carefully plug the transmitter receptacle back into the steering wheel connector. Be careful to observe correct polarity.

5. Reattach the steering assembly using the four long screws in the left side of the transmitter, then install the right side of the transmitter with the four short screws.

This whole operation took me about 5 minutes of which 2 minutes were spent reading the instructions.

I'm going to drop the Pro 2000 into my Kyosho Super Alta Porsche, which is the first electric car I ever assembled. Although I paid a lot less for the car several years ago, because of the dollar vs. yen exchange rate then and now, I would still recommend this car as a great "learner" car which is still reasonably priced.

The Kyosho Pulsar Pro 2000 is a very comfortable radio to use, the price is right, and there is a 6-month limited warranty and repair service offered by Hobby Services*. I enjoyed the review and look forward to other new Kyosho products.

Charlie Kenney, c/o Radio Control Car Action, 632 Danbury Rd., Wilton, CT 06897.

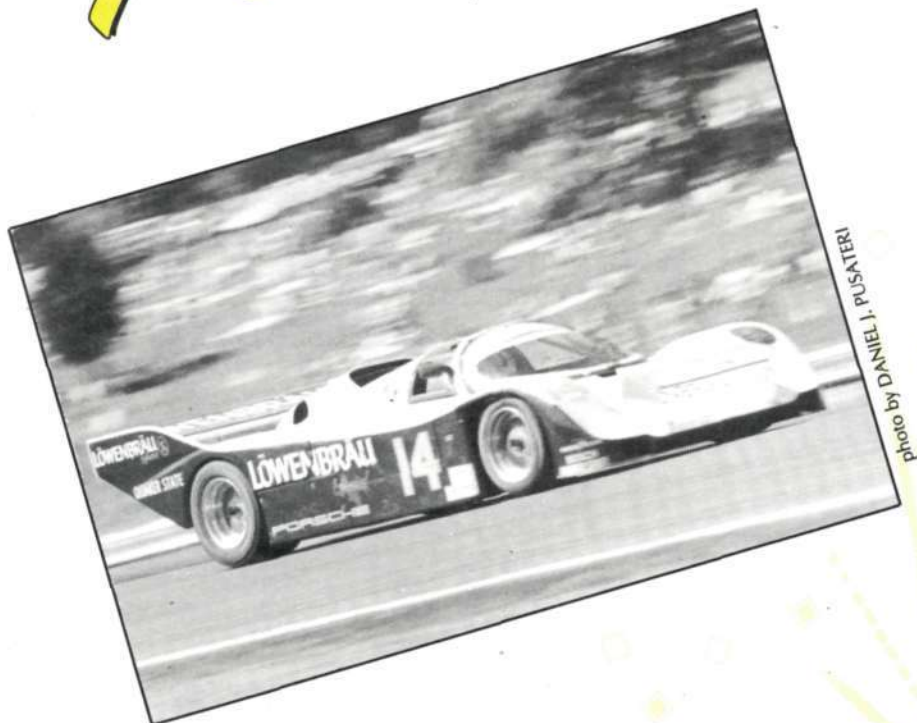
**The following are the addresses of the companies mentioned in this article:*

Great Planes Model Distributors Co., P.O. Box 4021, Champaign, IL 61820.

Hobby Services, 1610 Interstate Dr., Champaign, IL 61821. ■

The Pole Position

by RICH HEMSTREET

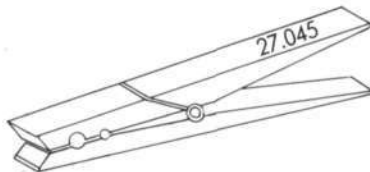


THIS MONTH I'll give you some tips for running your club races. New clubs are forming every month and all they really need is some organization to put on a good race.

Transmitter Impound Area. Every time your club sponsors a race, it's important that a transmitter impound area is set-up. If drivers are permitted to have a transmitter in the pits, inevitably it'll get turned on during the race. When this occurs, someone racing will experience a glitch on the track, causing a needless wreck. Driving a radio-control car in competition is difficult enough with just your own transmitter, but it's impossible with a second transmitter with your frequency on in the pits. It's not fair to the guys who are racing if they get interference from inconsiderate drivers in the pits.

Ideally, there should be someone checking all the transmitters into the impound area after each race. A radio left on in the impound area can cause problems in several races before it's located.

Frequency Clips. There should be some type of setup to prevent two drivers from being on the same frequency. Occasionally the person who arranges the heat board will accidentally schedule a frequency conflict in a race. If this isn't caught before the race is called to the starting grid, it'll delay your race and cause unwanted aggravation. By using clothespins with frequency numbers on them, you can prevent this problem. Have the frequency clips at the transmitter impound area. When a driver picks up his



transmitter, he places the clip on his antenna. If there is no clip available, it means another driver is already on that frequency. No one should ever be allowed to turn on his transmitter without the frequency clip on his antenna.

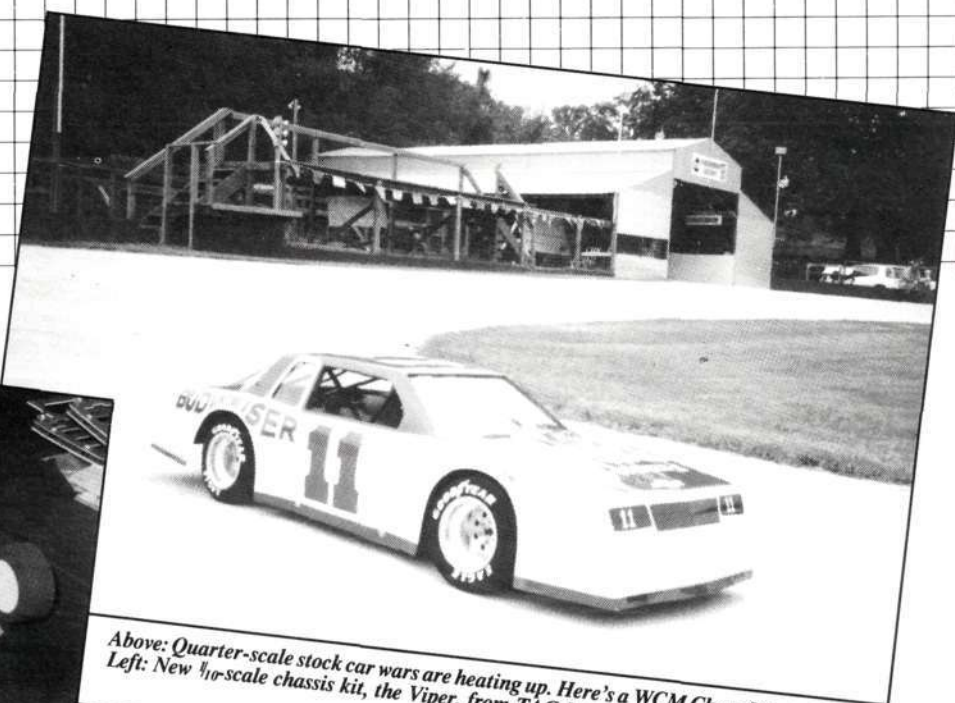
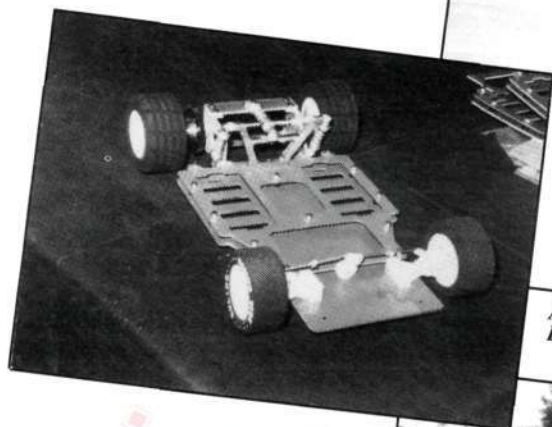
Scoring. Your club should be ready for whatever type of scoring that's going to be used. If you use pre-printed scoring sheets to record laps during a race, be sure there are enough on hand. Everybody likes to get credit for the full number of laps run. Make sure your scoring system is ready to go before each race. If hand-held "clicker" counters are used, have the race starter make sure they're all at zero before each race. Have spare batteries on hand for countdown timers.

Technical Inspection. If you want fair competition, your club will have to do technical inspections. It's easy to slack off on inspecting cars, but that's not good for the sport. If your rules call for 1/12-scale cars to weigh 32 ounces, but your club doesn't even own a scale, the weight rule is ineffectual. A simple balance beam scale will work fine. You don't need a high-tech digital scale to get the job done.

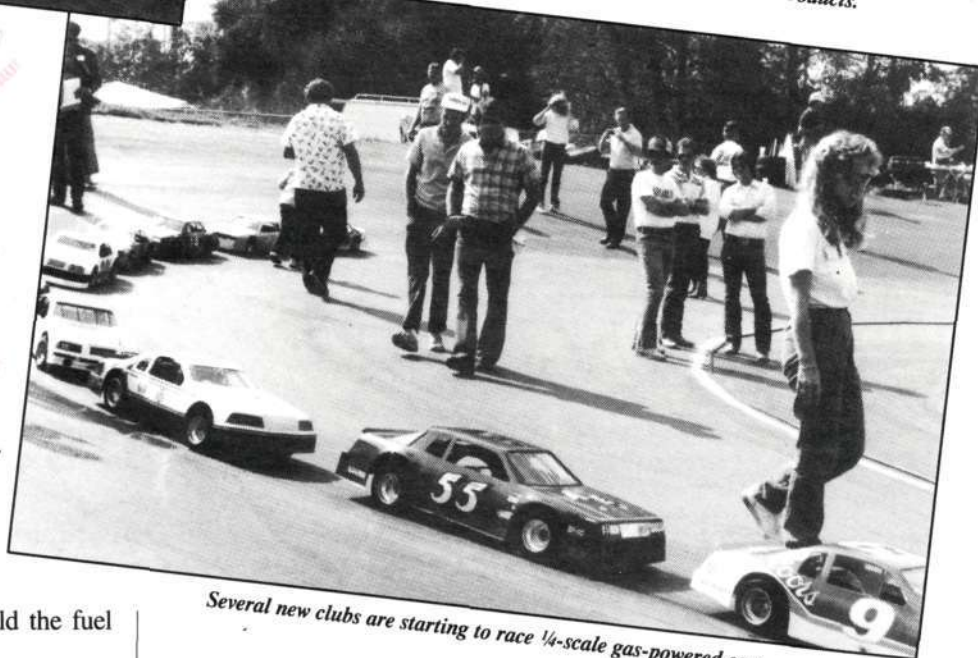
There can be certain problems that'll come up when your club tries to enforce motor rules. There usually isn't the dedication or the expertise to tear down electric motors to be sure they conform to specifications. For local stock motor series, it may be best to have the club buy a large supply of motors from one manufacturer and sell them to the racers at cost. Either seal the endbells or have the motors turned into the club after each race day. This makes motor inspection easy in the Stock class.

In the Modified class, I encourage a \$75 claimer rule. The A-main winner would have to sell his motor for \$75 to the lowest ranking finisher that wants to purchase it. If he refuses to sell, he's disqualified from the race and the second place driver becomes the A-main winner. While this won't guarantee the \$75 limit, at least there would be some form of control.

Cars should also be checked for overall dimensions, including tire sizes. Both 1/8- and 1/4-scale cars must be checked for safety features. The clutch must disengage at low rpm. The brakes must be fully functional. The throttle linkage



*Above: Quarter-scale stock car wars are heating up. Here's a WCM Chevy Monte Carlo.
Left: New 1/10-scale chassis kit, the Viper, from TAG Model Car Products.*



Several new clubs are starting to race 1/4-scale gas-powered cars.

should be inspected, as should the fuel tank.

All scales of cars must be inspected for safety. Pointed rollover antennas, and metal or sharp bumpers shouldn't be allowed on the track. Radio-control cars have an excellent safety record, but that doesn't mean we can rest on our laurels. We've got to work to keep it that way.

Heat Board. A well organized race will have a heat board positioned so that all drivers can see it between races. The board should show both the driver's name and radio frequency. The person in charge of setting the board should be the only one who makes changes on the board. If any driver changes his radio frequency, it

must be noted on the heat board. Obviously, someone should be responsible for preventing radio conflicts when setting up the heats and mains.

Competition Director. To keep things running on schedule, you need a take-charge person as your competition director (CD). The CD will decide the length of time between heats. He should be sure that each round of heats runs smoothly by urging drivers to the starting line, and starting races without drivers who are slow getting to the track.

Beginners Need Help. All clubs should

be aware that beginners need help to enjoy our sport. One way to help rookie drivers would be to hold a special series for them with veteran crew chiefs. Team up a veteran racer with a rookie driver. The veteran can help set-up the rookie's car and get the handling right. This way, the new driver can learn from the veteran and avoid a lot of problems which can arise from a poor-handling car. The veteran crew chief of the top finishing

rookie should get a plaque or trophy for his efforts. This'll help to encourage competition between crew chiefs.

IROC. Full-size racing has the International Race Of Champions (IROC) series that pits champion racers from different types of cars against each other in "identical" Camaros. Some local clubs have done this by using 1/12-scale BoLink* IMSA Camaro bodies mounted on the racer's own chassis. The IROC series usually consists of both ovals and road courses.

It would be great to see ROAR develop an IROC series for next year. Have all the ROAR National Champions from each class invited to participate in the series. Hold the events at the 1988 ROAR

Nationals. Use identical chassis, motors, radios, and bodies at each event. Run both road courses and ovals wherever possible, two rounds at each National. In 1/12-scale, use the Associated* 12E rather than the more fancy suspension cars. Stick with the BoLink Camaro bodies. It'd be easy to make a group of 12E's "equal."

For 1/10-scale off-road, you'll want identical two-wheel drive cars, maybe with identical pickup truck bodies. The Associated RC250s could be used for the 1/8-scale portion of the IROC series. A driver with little experience in scales other than his own specialty won't do as well as the more versatile driver in this series.

This series would be good for bringing

more attention to our sport. It'd be fun to see drivers from 1/10-scale off-road, 1/12- and 1/8-scale all compete in identical cars in all three scales.

Let me know what you think about an IROC series; perhaps *Radio Control Car Action* would get involved if there's enough interest.

Rich Hemstreet, c/o *Radio Control Car Action*, 632 Danbury Rd., Wilton, CT 06897.

**The following are the addresses of the companies mentioned in this article:*

BoLink RC Cars, 420 Hosea Rd., Lawrenceville, GA 30245.

Associated Electrics, 1928 East Edinger, Santa Ana, CA 92705. ■

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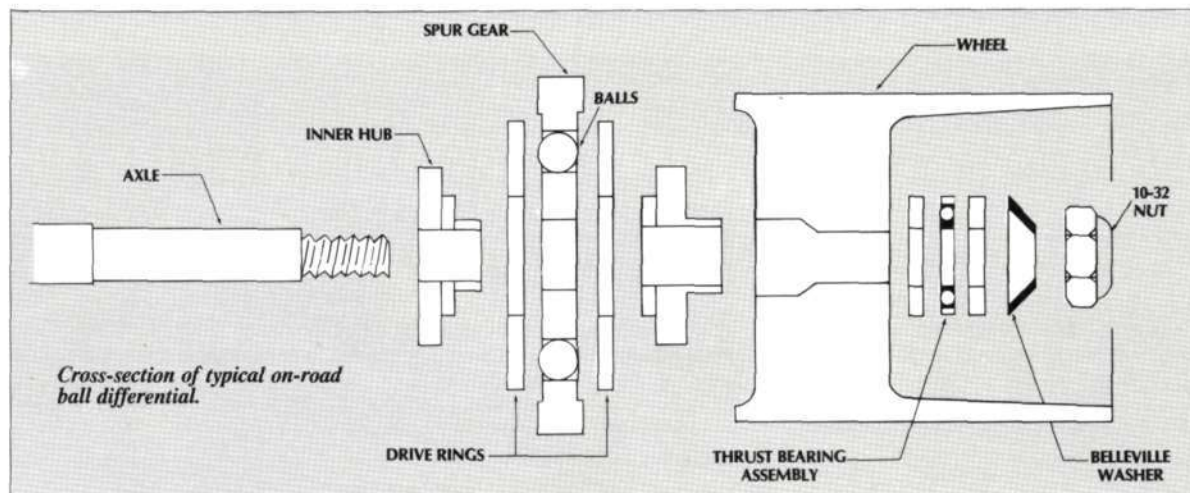
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Check, money order, VISA and MasterCard accepted.

Setting Up a Ball-Type Differential

by BUDDY BARTOS



sketch courtesy of ASSOCIATED ELECTRIC

AN IMPORTANT factor in current $1/12$ - and $1/10$ -scale cars' performance is a properly functioning ball differential. For top performance, you want to control where the slippage occurs in the differential.

In this article, I'll cover setting up a TRC* Pro differential. You can apply the techniques given to any ball type differential. The TRC differential features ball bearings and is used by many of the top racers around the world.

The first thing to do is put the axle in a $1/4$ -inch drill. Use steel wool to polish the aluminum part of the axle where the wheel and gear ride.

I'll use the Bud's Racing Products* pinned drive ring kit No. 2110. Just follow the instructions in the kit for mounting. The purpose of pinning the drive rings is to eliminate any chance of them slipping on the mounting hubs. This is critical for consistency in your differential's operation.

You should also pin the wheel spacing hub so that it doesn't spin on the wheel. This is done by placing the hub on a wheel and drilling a $3/32$ -inch hole into the hub through the screw hole in the wheel, then make a pin using $3/32$ -inch o.d. aluminum tubing. Glue the pin into the hub. Always install the wheel with the screw hole over this pin.

Now start assembling the differential using a Team Losi* 64 pitch spur gear, installing a $3/8 \times 1/4$ -inch flangeless ball bearing in the center hole. Set this up so that when the gear is spun on the axle it runs as true as possible.

Use a high-quality silicone lube such as Bud's No. 7460. Apply a thin coating on the axle shaft. Take a notched drive ring and position it on the axle hub. Notice that one side of the ring has sharp edges; it's important that this side goes toward the gear.

After setting the drive ring in place, apply a very thin coating of lube to the ring. Set the gear on the drive ring. Coat the differential balls with lube and insert them into the gear. Then set this assembly aside for a moment.

Now install the $3/8 \times 1/4$ -inch bearings into the spacing hub and the outside portion of the wheel. Place the other

notched drive ring on the wheel spacing hub, sharp edge toward the gear. Apply a thin coat of lube to the ring and slide this assembly on the axle. Always keep this axle in an upright position so the drive rings do not move out of place. Next install the $1/4$ -inch steel thrust washer. Apply silicone to the thrust bearing ball retainer and install on the axle. Then you install the second $1/4$ -inch steel washer.

At this point, take note to see that the last washer you installed is flush with or slightly beyond the end of the non-threaded section of the axle. If it isn't, use aluminum shims to space this out. Glue all spacers to the thrust washer.

I replaced the steel bellville spring washer with a Bud's No. 2130 plastic spring washer. The chamfered side goes toward the axle. Lightly cyanoacrylate this to the $1/4$ -inch thrust washer. Now tighten down the nylon locknut until it just touches the spring washer.

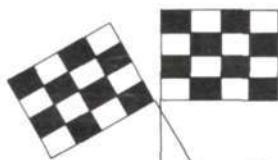
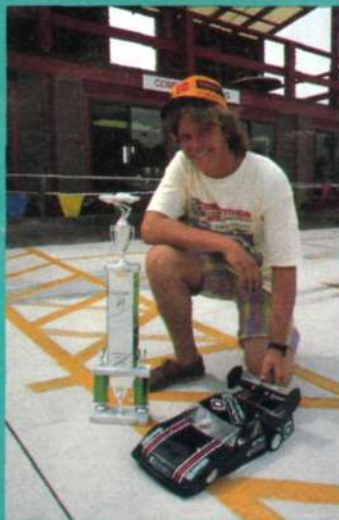
To set the differential, hold each rear wheel in your hands and try to rotate the gear with your thumb. You want this set so the gear doesn't slip, but you still have a smooth and free differential action at the wheels.

If the differential feels a bit scratchy, hold both the gear and the gear side-wheel with one hand and turn the other



Bud's Racing Products' pinned diff drive rings (also shown in place) and plastic spring washer.

(Continued on page 119)



The 1/10- and 1/12-scale

GRAND NATIONAL

Stock Car Championship

The awesome Lake Whippoorwill Speedway hosted this unprecedented event.

by RICH HEMSTREET

From top: Richie Schaeffer, $\frac{1}{10}$ Modified Pole Position winner; Jim Fuller, Pole Position qualifier in $\frac{1}{12}$ Invitational class; Buddy Bartos won BoLink Pole Position qualifier for $\frac{1}{10}$ Invitational class; Bob Rule of BoLink gives Jim Fuller his Pole Position trophy for the $\frac{1}{12}$ Invitational class.

CLOSE TO 150 RACERS gathered at Lake Whippoorwill International Speedway in Orlando, Florida, for the Grand National Stock Car Championships. If you've ever seen the Daytona 500 on TV, then you've seen Lake Whippoorwill Speedway. The 384-foot track was scaled down from blueprints used for the Daytona International Speedway. The track features high banked turns with up to 33° banking in the tri-oval. If you dig fast fender-to-fender R/C racing, then Lake Whippoorwill Speedway is the place to be. The racers were divided into Invitational



First-place Concours car of T.J. Wright.

(factory-supported) and Amateur classes. Both $\frac{1}{12}$ and $\frac{1}{10}$ scales were run, although $\frac{1}{10}$ -scale entries outnumbered $\frac{1}{12}$ by about four to one. The racing began on Friday with the Novak 500 for $\frac{1}{10}$ -scale cars.

This race featured ten invitational teams of two drivers each going at it for 500 laps. Each team had a two-man pit crew for battery changes and repairs. While some teams had done a lot of preparation for the event, others just went at it like a sprint race with battery changes.

The Composite Craft team engineered a quick-change battery pack system that made five-second pit stops possible. They also cut down some $\frac{1}{8}$ -scale gas tires to use on their Predator. The tires gave good handling with virtually no wear during the race.

One of the teams that wasn't very well prepared was the Buds Racing Products team of Buddy Bartos and Tate McDaniels. On Thursday night they put a battery pack holder in their Predator and decided to go for it. Friday night it became obvious that 500 laps was a sprint race.

The Novak 500 was exciting to watch. As the race went on, Bartos kept building his lead. On the average, all the cars had to stop for battery changes every five to seven minutes. When Bartos pulled out after battery changes, he was able to run 7.1-second laps. McDaniels only drove about 15 minutes of the event. About two laps from the finish, Bartos was involved in a wreck that

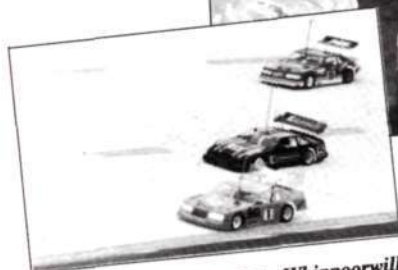
broke the front chassis crossbar and pushed the left front tire up into the body. With the chassis scraping the pavement, Bartos' last two laps were 18 seconds each. The tires were never changed on the winning car, even though the right front tire was worn down almost to the rim.

The winning car used a BoLink* T-Bird body, BoLink tires, CAM motor and, appropriately, a Novak* speed control. Bartos and McDaniels completed 500 laps in an hour and sixteen minutes.

(Continued on page 120)



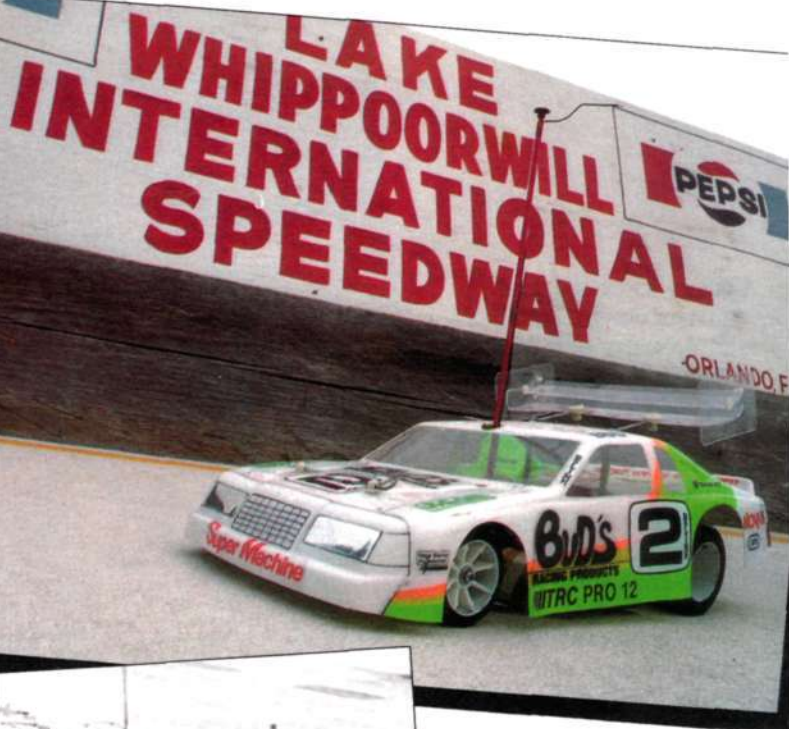
Buddy Bartos, No.3, racing Jay Halsey, No. 1.



Top: Jeff Davis with Miss Whippoorwill receiving the trophy for winning the 1/10 scale Invitational class. Above: These cars are traveling nearly 45 mph on this portion of the speedway. Buddy Bartos, No. 1, Kim Davis, No. 5, David Johnson, No. 8.



Above: The fastest closed-course 1/12 car in the world. Buddy Bartos averaged 6.01 seconds per lap for 2 minutes. Left: Typical nose-to-tail competition.



GRAND NATIONAL STOCK CAR CHAMPIONSHIPS

Class	Winners	Chassis	Motor	Tires	Body	Speed Control
1/10 Inv.	1. J. Davis 2. B. Bartos 3. K. Davis	Predator Predator Predator	CAM CAM CAM	TRC BoLink TRC	McAllister BoLink McAllister	Tekin Novak Tekin
1/12 Inv.	1. J. Fuller 2. B. Bartos 3. T. Morton	TRC Pro 12 TRC Pro 12 TRC Pro 12	CAM CAM CAM	TRC TRC TRC	McAllister BoLink ?	Novak Novak Tekin
1/10 Mod.	1. G. David 2. T.J. Wright 3. P. Simms	Predator Predator Predator	Twister Rev Tech Rev Tech	BoLink BoLink BoLink	McAllister Parma BoLink	Novak Novak Novak
1/10 Stock	1. C. Powers 2. T. Mays 3. R. Benash	Predator home-built Predator	Trinity Trinity Race Prep	BoLink BoLink TRC	BoLink BoLink BoLink	Novak Novak Novak
1/12 Mod.	1. B. Sumner 2. J. Robinson 3. B. Bazin	TRC Pro 12 TRC Pro 12 Delta	Trinity CAM Pit Stop	TRC TRC TRC	McAllister McAllister BoLink	Novak Novak Tekin
1/12 Stock	1. B. Bazin 2. B. Sumner 3. B. Fensterer	Delta TRC Pro 12 TRC Pro 12	Trinity CAM Race Prep	TRC TRC TRC	BoLink McAllister BoLink	Tekin Novak Novak

REEDY SPEED RUN

Class	Winner/Average Lap Time	Chassis	Motor	Tires	Body	Speed Control
1/12	B. Bartos (6.01 sec.)	TRC Pro 12	CAM	TRC	BoLink Thunderbird	Novak
1/10	J. Davis (6.67 sec.)	Predator	CAM	TRC	McAllister Olds	Tekin

Track Report

BOLINK

ROUND
TRACKER II

Sprint Car

One-tenth oval track venom!

by T.J. LYN

IN AN EFFORT to provide the R/C car enthusiast with the most versatile, single-chassis car kit, BoLink R/C Cars* now gives us the outlaw sprint car version of their Round Tracker II. BoLink's 1/10-scale car lineup gives you one common chassis with different types of front and rear suspension systems to suit any type of

racing. With the popularity of oval track racing increasing every day, along with the ever-increasing popularity of sprint car racing, BoLink has added this outlaw sprint car body and wing kit to its versatile car design.

The sprint car kit contains the same basic components as BoLink's asphalt Round Tracker, with the exception of the type of tires, which are dirt tires instead of smooth asphalt ones, and a sprint car body and oversize outlaw wing instead of a stock car body.

Construction of the BoLink sprint car utilizes only the basics in chassis components, there are no shocks or heavy independent suspension items to weigh this Round Tracker down. The design is for smooth surfaces, such as hard-packed dirt or asphalt, so suspension travel to absorb shock is not needed. The shock is absorbed through chassis flex in the fiberglass and nylon components.





Assembly is quick and easy, all you have to supply is a two-channel radio system. The Round Tracker II is complete to the point that BoLink even has a 6-cell pack and DC charge cord included. The motor supplied is a stock Mabuchi 540 type with the BoLink name on it. This, using the kit-supplied 10-tooth pinion gear on a limited slip differential, provides a nice punch. The differential is fully adjustable, which is a must for optimum performance settings. Because track conditions do vary, so must differential settings.

The kit also provides the BoLink 4620 speed control, pre-wired and ready to mount to almost any size servo. The speed control is a resistor type with a servo-mounted wiper blade. The entire unit is attached to the speed control servo with servo tape. The speed control assembly is then placed on the radio tray and is held in place with a tie-wrap. The radio receiver is held in place with kit-supplied servo tape or you can use Velcro, which makes for quick radio removal and also provides some



additional shock absorption for the receiver.

The steering assembly is as basic as the rest of the car. Mounting of the servo is done using another tie-wrap and some servo tape for a little extra holding power. Wire linkage arms are then placed between the servo and the steering blocks, toe is set, and all that's left is to prep the sprint car body and wing.

The assembly of the Round Tracker

(Continued on page 84)



BoLink's sprint car on its way to the race track via Sticky Group International's Race Case.

Track Report

World Champion Team Associated went back to the drawing board and designed the ultimate 1/12 car.

by MIKE LEE

JUST WHEN you think the ultimate race car kit has arrived, someone comes out with another car they claim is better. Such is the story of progress and racing. Racing is the motivation which keeps manufacturers progressing. Without racing, there is no forward motion, and therefore no better cars. Progress is the reason for the subject of this review, the Associated Electric* RC12L road

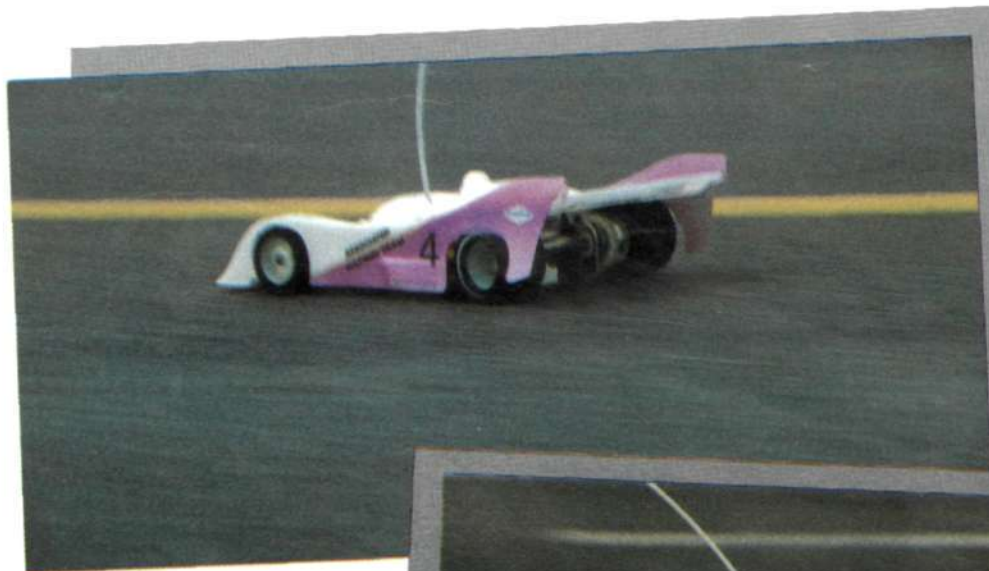
racer. If you're familiar with Associated, you'll know that the previous 12i version is one heck of a race car. It not only won many national and world titles, but was also upgraded almost daily in order to stay on top.

But, as most racing stories go, you can't keep modifying the

same thing, because eventually you end up with a new car. Before that happened, Associated went to the drawing board, put all the racing knowledge they had into a brand new design, and then sent it to the track.

The result was a world class car that proved itself the first time out in the hands of Tony Neisinger. Tony captured the world title in Las Vegas with his prototype 12L, and he was followed by at least two other 12Ls in the top five places.

Now this top-caliber car is in full production as the RC12L kit. The 12L is available in either fiberglass or graphite



Associated
Electric
**RC
12L**



chassis versions. The graphite version, the one I'll cover here, is for the serious racer who wants a car that will not only be strong, but lightweight, too.

THE KIT. The 12L starts with a basic pan chassis made entirely of graphite. It is pre-drilled for all mounting screws and the screws are all countersunk, which makes for a smooth underside with no screw heads to catch on pavement or carpet obstructions. The chassis also has lightening holes to reduce weight. Once you hold one, you'll know just what the meaning of "lightweight" is.

The chassis requires very little work. You have to sand the chassis holes where the batteries will go in order to allow them to sit down low. In fact, the batteries should lie flush with the bottom of the chassis. The instructions say this is to make the car's center of gravity as low as possible, which might not seem like much, but when Associated gets serious, they make everything count.

The battery pack configuration is two sets of three batteries placed side by side. This is a departure from their previous practice of using standard stick packs. The result is more evenly distributed weight and better handling. The driver must wire the batteries, but this is no sweat.

The front end is more conventional, with two nylon mounting blocks with the knuckle arms attached. A threaded tie rod with two ball-link connectors is mounted between the two blocks to prevent in-and-out stressing of the forward chassis. If you want, you can use it to pre-load the front end for different track conditions.

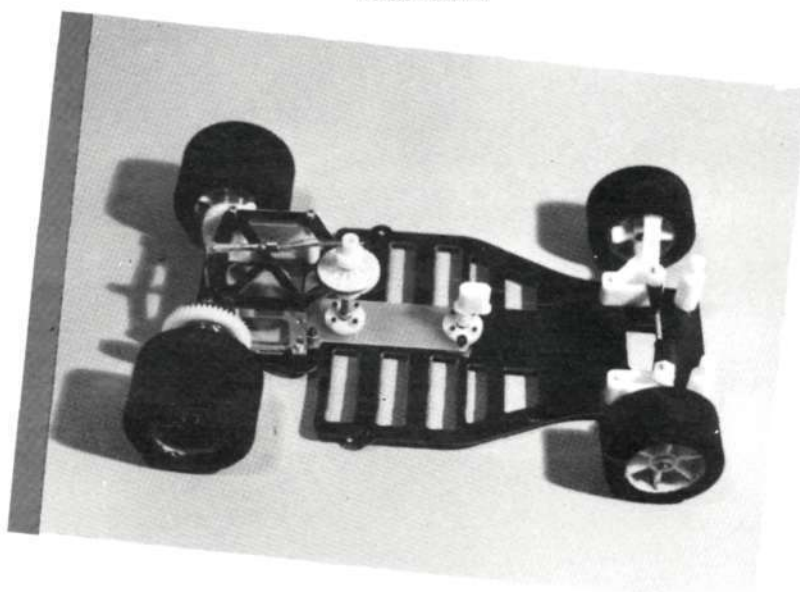
Suspension at the front end is accomplished using long travel springs at the knuckle arms. Two sets of springs are supplied to allow tuning of the suspension to the track. I used the soft set first, per the instructions. Tires are last, and are a new Associated design. They're made of nylon and are therefore very lightweight. Ball bearings on the axle round out the front.

At the rear you'll find the real change. The rear end is a whole separate unit which is attached to the main chassis

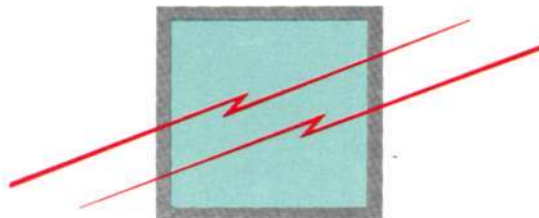
(Continued on page 121)



Above: 12L has side-mounted batteries, making for a well-balanced car. Below: Overview of rolling chassis. Note lightening holes to save weight. Graphite version shown.



Basics of Electronic



SPEED CONTROLLERS

Make your race car a high-tech competitor with an electronic speed controller.

by MIKE LEE

TODAY'S modern technology leads to better products. In our hobby/sport, this means the development of items which help us get that winning edge. One of the biggest and best breakthroughs of the decade is the electronic speed controller.

To my knowledge, there are only a couple of cars currently on the market which come with electronic speed controllers. However, virtually every car can take advantage of these superb throttle devices. Let me explain just what an electronic speed controller is and how it works.

Basically, the electronic speed controller is a solid-state device which responds directly to signals from the receiver in your car and in turn provides a varying degree of electrical power to the motor. In other words, it does what your present resistor-type speed controller does in response to your transmitted command, but without any moving parts.

One of the biggest advantages to the electronic speed controller is that it can

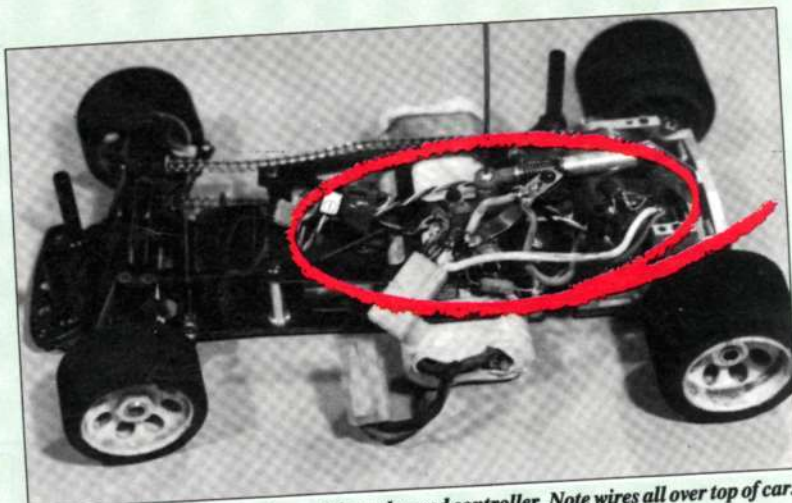
respond to your command as fast as you can pull the throttle trigger on the radio. Compare the average transit time of most servos versus the response time from an electronic speed controller. Most servos have a transit time of about $\frac{1}{3}$ to $\frac{1}{2}$ second for a 90° rotation. That's really not too bad considering how fast most of us humans can respond to another car jumping out in front of ours. But the electronic speed controller has a response time of better than $\frac{1}{1000}$ second. You can't even blink that fast! There is no comparison between the response time of the standard servo-operated throttle system and the electronic speed controller.

How does this affect us at the race track? The difference is dramatic. What used to be a long haul down the straightaway at full blast, then letting go of the throttle about 15 feet before the turn while waiting for the brakes to come on is now the same straightaway blasted all the way up to the turn before hitting the brakes, because they're now instant brakes. That translates to shorter track times. Or take your standard drag race.

Everyone knows that the guy with the hole shot has the big advantage. If you're up against a car with a servo-operated throttle and you have the electronic box, you're going to hole this guy by at least 1/5 second. That's a lot in a drag race!

How do these magic boxes work? There are basically two types on the market, the transistorized and the MOSFET designs. The transistorized units work as effectively as the MOSFET, but cannot withstand the incredible voltage and amperage surges that might be inflicted on them from hard driving and super hot-wind motors. They also tend to be physically larger in size and bulk, but are very economically priced.

The MOSFET-type designs are currently the most advanced. They deliver fast response times and are capable of extreme high amperage surges while being very small and lightweight. They cost more than their transistorized counterparts, but are far more versatile due to their size and power capacity. Some of these designs also feature optical power couplings to reduce electrical noise, and most are fused to prevent damage to themselves or to their host radio and battery should a complete stall or overload occur.



Kyosho Phantom MK II road car with stock speed controller. Note wires all over top of car. Remove entire speed controller unit with wires, leaving motor wires only.

In operation, the electronic speed controller receives a power signal from the receiver, setting the neutral position and forward and reverse power positions. Upon pulling the trigger from the radio, the receiver sends a signal pulse to the speed controller and tells the controller to open a power "gate" and allow electricity to flow through. The more you pull the trigger for speed, the wider the gate is opened and the more power is allowed to flow. It sounds simple, but it took a real genius to make it work that way.

What does it take to install one of these jewels? For demonstration purposes I used the Kyosho Phantom MK II road car from Great Planes Model Distributors*. This car is a four-wheel drive asphalt road car that has served me very well indeed. It has a multi-band ceramic speed controller driven by a mini servo. Our subject electronic speed controller is the Model 500 (part No. 96307) from Airtronics*. This is a MOSFET speed controller with adjustable neutral and top end, plus brakes.



AIRTRONICS 1000 and 500

Type: MOSFET semiconductors

Voltage Capacity: 6.0 to 11.0 volts DC (Model 1000); 6.0 to 7.2 (Model 500)

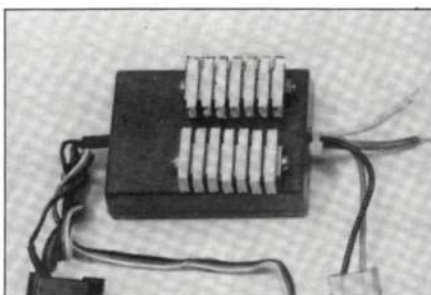
Amperage Capacity: 30 amps continuous, 150 amps surge (Model 1000); 20 amps continuous, 60 amps surge (Model 500)

Size: 1.25x1.73x.63 inches (both units)

Weight: 1.2 ounces (both units)

Additional Features: F Point Checker included for tuning, adjustable neutral, and full power.

Source: Airtronics, 11 Autry, Irvine, CA 92718.



ARISTOCRAFT/HITEC SP-2040R

Type: Transistorized Switching

Voltage Capacity: 5.0 to 9.0 volts DC

Amperage Capacity: 20 amps continuous, 40 amps surge, 30 amps reverse

Size: 2.35x1.5x1.25 inches

Weight: 2.6 ounces

Additional Features: Proportional reverse speed, adjustable neutral and power, extra heat sinks, BEC.

Source: Polk's Modelcraft Hobbies, 346 Bergen Ave., Dept. 97C, Jersey City, NJ 07304.



FUTABA MC109 (MC9)

Type: MOSFET

Voltage Capacity: 6.0 to 9.6 volts

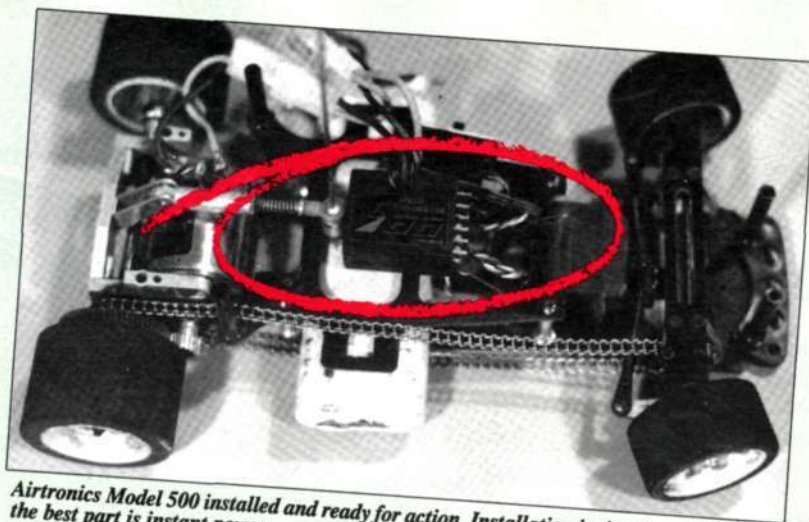
Amperage Capacity: 150 amps continuous, 450 amps surge

Size: 1.17x1.59x.61 inches

Weight: 1 ounce

Additional Features: Proportional forward; electronic braking; 7-FETs; neutral, high speed, and curve adjusters; built-in optimum circuit check.

Source: Futaba Corporation of America, 555 W. Victoria St., Compton, CA 90220.



Airtronics Model 500 installed and ready for action. Installation is simple and fast, but the best part is instant power.

To install the Model 500, or any other electronic speed controller, start with the removal of the old resistor speed controller. You'll note in the photos of the Phantom how there are the unavoidable wires all over the top end from the standard speed controller. Simply remove the entire speed controller, servo and all, leaving only the power plug from the motor. Now find the power plug from the electronic speed controller and plug this into the motor plug. You might have to add this plug to your speed controller.

Because the Model 500 controller also regulates the power to the radio receiver, add a servo plug to the controller. This will plug right into the regular throttle servo lead on the receiver. Lastly, add a battery wire plug to the speed controller to match the main drive battery. That's it. The hard part is done and you're ready to mount the speed controller on the car. This is simply a matter of some double-sided foam tape and placing the unit somewhere where the least amount of vibration and dust can get to it.

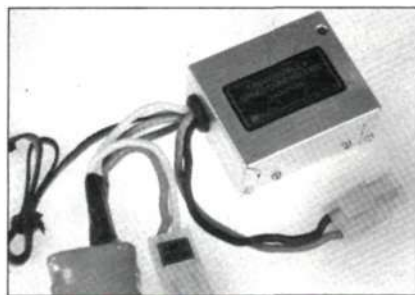
Adjusting the Model 500 is like adjusting most other speed controllers. Airtronics thoughtfully includes a little device called the "F Point Indicator," which plugs into the motor plug and tells the mechanic when the speed controller is adjusted to full power delivery. A small LED light is the only indicator needed. Two separate adjustment ports allow the mechanic to tune the speed controller to the position desired on the transmitter for neutral and full power. The only tool needed here is a small screw driver. Once the speed controller is adjusted, it's time to hit the track and find out what instant power is all about!

There you have it, the simple installation of the most valuable speed secret going. Using the speed controller, you'll discover just how deep you can plunge into turns and just how fast you can scat out of them. Feathering the power through those large sweepers is now a snap, and your car will run longer and faster than before.

**The following are the addresses of the companies mentioned in this article:*

Great Planes Model Distributors Co., P.O. Box 4021, Champaign, IL 61820.

Airtronics, Inc., 11 Autry, Irvine, CA 92718.



CIRCUS JRA-700 and 700B

Type: Switched transistor

Voltage Capacity: 6.0 to 8.4 volts DC

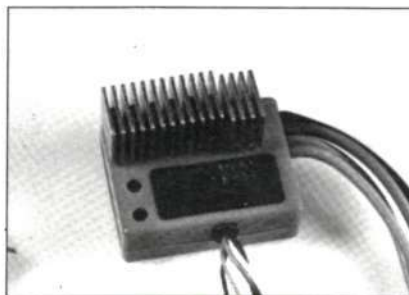
Amperage Capacity: 25 amps continuous, 50 amps surge, 25 amps surge in reverse.

Size: 2x1.7x.85 inches

Weight: 2.6 (700) and 3.5 (700B) ounces

Additional Features: Monitor lamps for power adjustment, adjustable power, neutral and reverse (700B), reversing module (700B).

Source: Circus Hobbies, 3132 S. Highland Dr., Las Vegas, NV 89109.



TEKIN EFC 190

Type: MOSFET semiconductor

Voltage Capacity: 4.8 to 12.0 volts DC

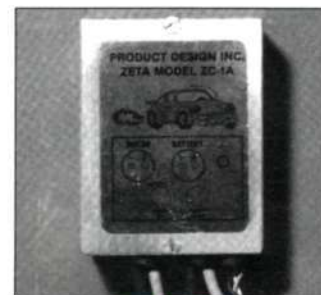
Amperage Capacity: unknown

Size: 1.45x1.30x.5 inches

Weight: 1.4 ounces

Additional Features: Adjustable power, neutral, and brakes; 20-mAh draw; .07-volt drop at 12 amps load.

Source: Tekin Electronics, 2411 S. El Camino Real, San Clemente, CA 92672.



PDI ZETA

Type: MOSFET semiconductor

Voltage Capacity: 4.8 to 9.6 volts DC

Amperage Capacity: 60 amps continuous, 200 amps surge

Size: 2.25x1.75x1.0 inches

Weight: 4.5 ounces

Additional Features: 200 milliohms resistance, completely sealed case, leash circuit to prevent "runaways," adjustable brakes. Three models available, including a marine version.

Source: Product Design, Inc., 16922 N.E. 124th St., Redmond, WA 98052.

HOBBY SHACK KO PROPO CX-IIR and RM-7

Type: MOSFET semiconductor

Voltage Capacity: 6.0 to 8.4 volts DC
(CX-IIR); 4.8 to 9.6 volts (RM-7)

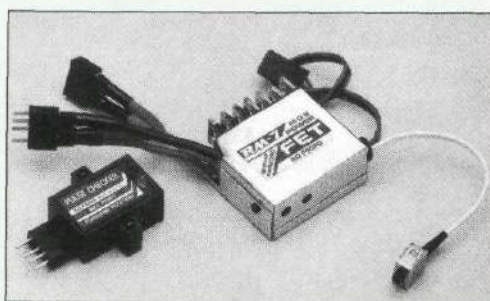
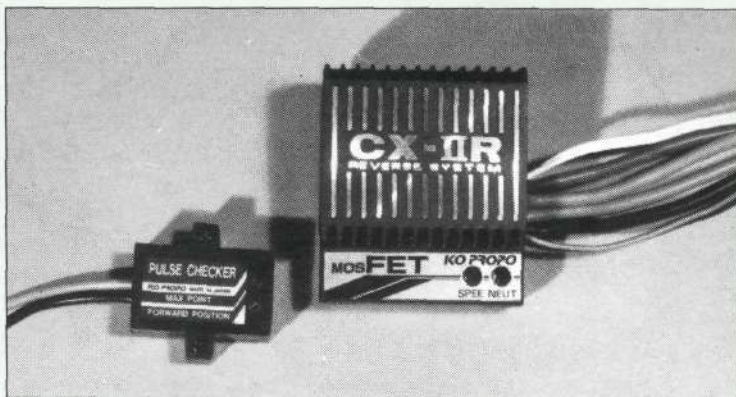
Amperage Capacity: 80 amps continuous, 300 amps surge (CX-IIR); 100 amps continuous, 350 amps surge (RM-7)

Size: 47x41x27 mm (CX-IIR); RM-7 is unknown but is substantially smaller

Weight: 84 grams

Additional Features: CX-IIR has MOSFET reverse at half-speed, extreme small size on RM-7, both feature KO Pulse Checker for tuning units, adjustable power and neutral pots.

Source: Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92728.



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Kyosho

WORLD SLUTE

from Great Planes Model Distributors

by JOSEPH BRUNI

I has been two years since Kyosho of Japan, distributed in the U.S. by Great Planes Model Distributors*, introduced the most successful line of off-road, four-wheel-drive, 1/10-scale racing models, the Optima series. Now with the culmination of two year's racing experience, the innovative research and development team at Kyosho has meticulously fused the advanced performance technology of their

Track Report

**From its successful predecessor, the Optima,
the Salute has evolved into a superior contender.**



world champion Turbo Optima with a sleek new aerodynamic body to create the perfect and superior clone, the Salute. By adding an optional LeMans 240 SB motor and the new Kyosho 7-cell 8.4-volt Turbo racing pack, the synergy is lethal!

THE KIT. As soon as you open the Salute's colorful sturdy box you'll notice that all the parts are securely packaged and labeled. The 28-page assembly manual is the finest I've ever seen. Aside from having detailed diagrams, there are several pages of vital adjustment, maintenance and performance hints as well as a list of suggested optional parts and further readings. Included in the kit are three Allen wrenches, shock oil, silicone, and screw-locking compound. For proper assembly, the builder will need to supply a Phillips screwdriver, needle-nose pliers, hobby knife, and scissors.

The Salute boasts an impressive list of performance features. Designed for quick and easy adjustments, the strong aluminum ladder-type frame is the basis of the car's structure. By adding Option House gold premium fully adjustable racing shocks, four heavy-duty extra-long nylon wishbones, front and rear adjustable stabilizer bars, Kyosho has produced a state-of-the-art suspension system that's very hard to beat. The four-wheel-drive power system is composed of twin (front and rear) differentials connected directly by a hardened-steel chain, optimizing maximum torque to each wheel. The motor is mounted to the rear of the Salute, creating a perfectly balanced center of gravity and is integrated to a unique torque-limiter system. This

photo courtesy of KYOSHO



system mimics a clutch, thus preventing any excess motor strain or gear damage from sudden high-torque starts or if the wheels become jammed. The kit also includes 16 ball bearings and the new Battery Eliminator Circuitry (B.E.C.) with the option of a 8.4- or 7.2-volt connector, depending on the power source used.

There is all the necessary mounting hardware for any major-brand two-channel radio system. I chose the new Kyosho Pulsar 2000 pistol-grip, two-channel radio system for my Salute. The system features adjustable wheel-grip tension, servo reversing and adjustable throttle trigger centering. The two small KR-88 servos and mini-lightweight KR-2M receiver are extremely versatile and fit any scale R/C car. One feature of the Pulsar is its ability to be converted in a matter of minutes to accommodate a right- or left-handed driver.

CONSTRUCTION. The 53-step assembly took about six hours from box to track. Before beginning, as a general rule, whenever aluminum parts are utilized in an R/C kit, the builder is advised to apply a thread-locking compound to nuts and bolts in order to prevent their loosening during operation.

The Salute's assembly begins with the twin differential systems. In keeping with Kyosho's tradition, the differentials are pre-assembled at the factory. Following the addition of six ball bearings and choosing one of three possible gear ratios,

the two differentials are sandwiched between two fiber-filled nylon gear housings and connected to each other by a tempered-steel chain. Since my local track has a number of steep inclines, I chose the 18-tooth-rear to 19-tooth-front gear ratio. This combo provides increased power to the rear wheels for accelerated climbing and cornering capabilities.

Construction continues with the addition of the eight aluminum chassis components. At this point the Salute's strong cage-frame is complete. Next is the integration of Kyosho's race-proven suspension system. The extra-long suspension arms are composed of a revolutionary, lightweight EX6 nylon that enables the car to plow over any type of terrain without the worry of cracking or breaking. Power is transferred to all four wheels by hardened-steel swing shafts. The Kyosho racing shocks are pre-assembled and require addition of shock seals and the proper amount of shock oil.

The Salute arrives without a motor, I chose the LeMans 240 SB for this track report. This is Kyosho's quickest 4-minute off-road motor, churning out more than 30,000 rpm. The motor features dual ball bearings, aluminum endbell, adjustable timing, diamond-true commutators and coils potted in epoxy resin. All necessary

mounting hardware is included in the kit.

Installation of the Kyosho Pulsar radio system was flawless. The receiver On/Off switch, throttle servo and speed controller are mounted to a fiberglass radio plate that also provides mounts for the motor battery. The car includes two battery connectors and can be set-up for a standard 6-cell, 7.2-volt battery or, as I chose, a 7-cell 8.4-volt racing pack. The aerodynamic Salute body, wing driver are clear and require painting and trimming. I applied two coats of Tamiya's specially formulated polycarbonate paint. The body was then trimmed and further detailed with the included pressure-sensitive decals.

PERFORMANCE. Before my initial test-run, I chose to advance the LeMans 240 SB's timing 4°, thus increasing top end and improving acceleration. This task was easily accomplished by following the detailed performance adjustment section of the instruction manual. After a 20-minute quick charge to the 7-cell, 8.4-volt turbo pack and some minor camber adjustments, the Salute was ready for action.

(Continued on page 102)

PARMA



by STEVE POND

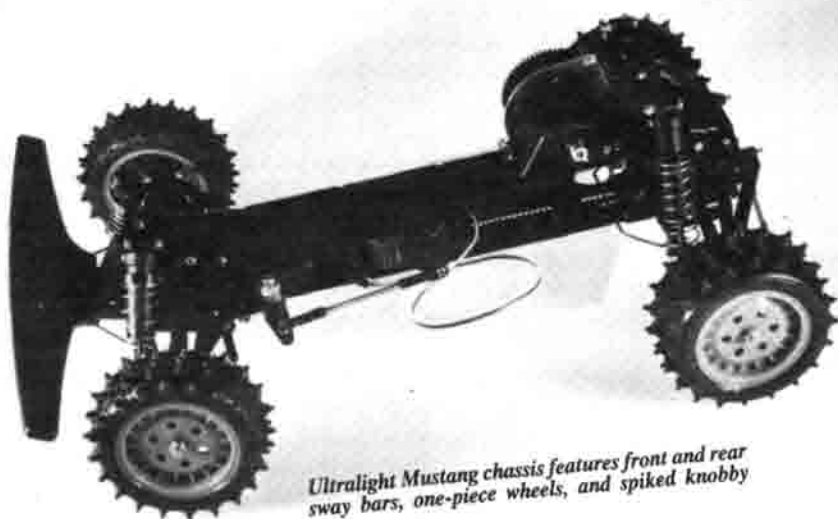
THERE ARE SOME very dominant forces in the automotive industry. And there are many vehicles which have written their own pages in my mind's book of record accomplishments in the world of racing. Cars such as the Ferrari Testarossa or the Lamborghini Countach are such machines. Although "street legal," these automobiles harness 12-cylinder powerplants (as much as three Shelby Chargers!) and are capable of 200-mph romps down the local freeway.

Then there are rocket-cars such as the "Blue Flame," the first to break the sound barrier (720 mph) on land. Others are the McLaren, which dominated the world of GT racing, and on the drag racing scene, there's "Big Daddy," Don Garlitt's top-fuel dragster which is outdating the record books as fast as they can be inscribed—the list goes on.

I'd like to introduce yet another car which has written a new chapter in my book of the elite, the Parma* PB Mini Mustang. It doesn't have a \$100,000+ price tag, or a 12-cylinder engine, but the 1/10-scale off-road PB Mini Mustang certainly does shine.

THE KIT. The PB Mini Mustang comes in either two- or four-wheel drive, and the four-wheel drive has the option of a two-speed automatic gearbox. I tested the four-wheel drive with the two-speed gearbox. The features of the Mini Mustang include a fully enclosed



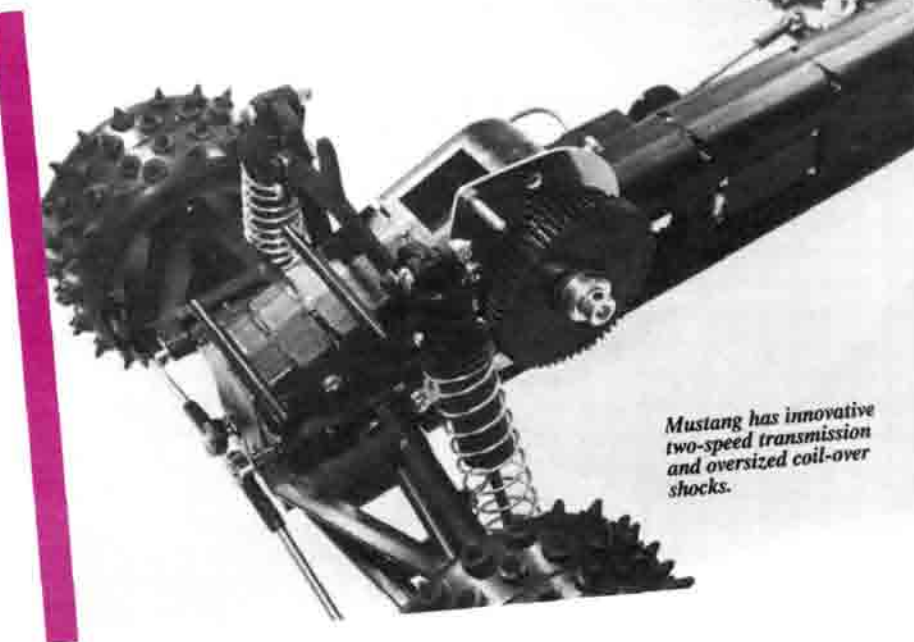


Ultralight Mustang chassis features front and rear sway bars, one-piece wheels, and spiked knobby tires.

belt, adjustable gear ratios, ball bearings as standard equipment, fully independent double-wishbone suspension with triple O-ring shocks on all corners, front and rear anti-roll bars, adjustable camber, toe-in, spring rate, ride height, and a quick-change battery location and connector.

As with almost any other kit, you'll need a two-channel radio system, a battery pack, and other items, such as tools and paint, to complete the car. The radio system I chose was the new KO PROPO EX-5 from Hobby Shack*. The EX-5 I received came equipped with a PS-201S high-speed servo, a KR-285A receiver, and a CX-IIR electronic MOS-FET speed control without reverse. The EX-5 has a long list of features, including a removable transmitter antenna, reverse button, steering rate adjustment, steering and throttle trim, battery meter, charging jack for optional Ni-Cd batteries, and an adjustment panel. Behind the adjustment panel there are, left and right, steering end point adjustments, steering and throttle reverse switches, brake, reverse, and throttle high end point adjustments.

Other items which are not included in the kit are a speed control and a motor. The reason for this is simple: most racers will change the motor and add an electronic speed control. The speed control came with the radio, and the motor I



Mustang has innovative two-speed transmission and oversized coil-over shocks.

selected was the awesome Revtech* Yokomo Enduro No. 4180. This motor along with many other Revtech motors are hand-wound and assembled with the utmost care.

ASSEMBLY. The assembly process begins with the bevel gear differentials, then proceeds to the axle blocks. Once this is complete, move on to the steering servo installation. The PS-201S fits snugly, which is instrumental in keeping dust out of the belt system. Next, the belt

tensioner is secured to one of the chassis halves, and then the two halves are joined together.

The kit includes a number of self-tapping screws for joining these halves together. I found these screws unable to get a good bite in the glass-filled nylon, and were easily stripped. In my particular kit, the chassis halves didn't butt together and the self-tapping screws were not long enough to pull them together. Upon further inspection I found that the left-

side chassis half is molded to fit a small nut. After trying a few different sizes, I found that the Du-Bro* 2x8-mm Allen-head screws and 2-mm nuts were a perfect fit. As a matter of fact, I wouldn't recommend leaving the hobby shop without a pack of these.

Once the chassis halves are joined together, install the motor plate, lay shaft, and two-speed transmission. The instructions outline the assembly for a single-speed; for the two-speed, there are

(Continued on page 112)

STRIKER



photos by DANIEL J. PLASTERI

by T.J. LYN



A NEW LOOK IN ENTRY-LEVEL OFF-ROADERS

MRC/TAMIYA'S* MOST recent entry into the off-road buggy market is called the Striker. The formula-type body design is unique for one of MRC's off-road buggies. MRC likes to follow their own traditions, with 16 off-road cars on the market already, and more in the works.

The Striker is MRC's latest competition for their own Grasshopper, Hornet, and Falcon. It's an entry-level buggy that's easy to assemble and maintain. All you'll need to supply are the two-channel radio system and a 7.2 volt battery or a 7.2 volt Ni-Cd racing pack.

The Striker's chassis is an injection-molded box-type frame similar to the Falcon, but is topped off with a more durable formula-type body design. It gives it a sharp, aerodynamic look, and can be easily removed for maintenance. It's attractive enough alone in its molded white color, or can be painted with plastic model paints for greater realism.

Installing the radio system is simple, whether you use the provided receiver battery box, or the optional Battery Eliminator Circuitry (BEC). If you decide to use the radio's battery box, it installs very neatly under Tamiya's standard three-step forward/reverse speed control. Once again, this assembly is quite similar to that of the Falcon. After the speed control assembly and the steering servo are neatly in place, the front swing-axle suspension is the next item.

As mentioned previously, the front suspension is a swing-axle design with a lower A-frame on each side dampened by single coil springs. This front assembly is the same as the Grasshopper's, except that the lower arms are much heavier in construction. However, the springs and dampener shafts are exactly the same. The Striker's wheel base is wider than the Grasshopper/Hornet, and this spring assembly doesn't appear to provide the best performance. If the Striker's got a weak link, this is it.

In our track testing the front suspension gave very poor steering response and bottomed out on just about every little bump. I recommend that a heavier front shock and spring system be added to give the Striker better handling and steering performance. Unfortunately, MRC doesn't provide enough information in their manual regarding optional front suspensions. There are a variety of after-market manufacturers which can fill this need.

Parma International* is the name that comes to mind. Parma makes an oil-filled front shock for the Grasshopper/Hornet which works great. The front end of the Striker rolls on a semi-pneumatic straight-ribbed tire, and the whole front assembly is protected with a large reinforced bumper that helps to absorb contact with any number of obstacles.

The rear suspension of the Striker is a coil-spring arrangement similar to the front but of heavier design. This does an adequate job, but once again I'd recommend replacing this system with an oil-filled shock and coil-over spring. MRC does have an optional parts list for this in its manual, part No. SP 5305, is the replacement. It's the same front or short shock system that's used on the Falcon. The increased performance and handling you'll attain from this addition will be well worth the investment.

(Continued on page 96)

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MRC BEETLE

(Continued from page 22)

little careless, yes, but precisely what the Beetle was made for. And I have no reservations about going full-tilt boogie over the top of a berm. This is all made possible by the oil-filled coil-over shocks and the over-size tires. The Beetle can most times land on all fours, even with its seemingly high center of gravity. When the Beetle wasn't fortunate enough to land paws down, the injection-molded body (unlike the flimsy Lexan types) took

the lumps like a champ. In short, the Monster Beetle is built to take a serious thrashing. However, I don't recommend driving it on hard surfaces as the street or sidewalk because these will cause excessive wear on the spikes of the tires. If you wish to do some pavement pounding, I'd suggest picking up a pair of Blackfoot tires and saving the Beetle's spikes for the off-road chores.

If you too are tired of the same old hunt, have a look at the Monster Beetle, which might well be the egg you're looking for!

*The following is the address of the company mentioned in this article:

MRC/Tamiya, 2500 Woodbridge Ave., Edison, NJ 08817.

AYK PARSEC

(Continued from page 38)

rims. With this, I headed for the track.

PERFORMANCE. I set the Parsec on dry asphalt and gave it a slow stroll around the track for a couple of laps. I

(Continued on page 84)

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AYK PARSEC

(Continued from page 82)

then lubed up the motor once again and put the Parsec down for the test.

As I mentioned before, with the Race Power Dyno-Tuned motor, you will get peppy performance. I did, and my first drive was a thrill. The Parsec is fast with stock gearing, hitting about 28 mph by the end of the straight. That's cooking for a stocker. I soon found the Parsec doing

exactly what it was supposed to do with all that neat suspension stuff—taking the road by storm!

Handling was superb in the rough stuff, and the sweeping turn at the end of the test track could be taken at darn-near full blast. The differential delivered solid performance, transferring power to the right wheels through all turns. The entire suspension package seems to work well, keeping the car on the ground and in full control. The EX-5 radio did a fine job of

guiding the Parsec, providing a solid radio link at all times. The CX-IIR speed controller was reliable all the way down to crawling speed when the batteries finally pooped out.

The real test came when the Parsec competed against other cars, otherwise known as racing!

The Parsec had taken only a few laps when I determined that it was ready and dialed in, save for some tire dressing. I didn't even bother to wring out the bugs when it hit the track for the first heat race. As it turned out, the Parsec became an early leader in the heat and qualified well. The second heat it did almost as well, despite a loose axle late in the heat which pitted the car for several laps. In the main event, the Parsec held her own and placed second. That's not bad for a car which had less than 5 minutes running time before racing in earnest.

Overall, I'd have to say that the CRX Parsec by AYK is one of their finest efforts to date. The car does exactly what it's supposed to do and that's being competitive. It has speed, light weight, and great handling. With a little tire dressing it should be able to stick where no car has stuck before. Coupled to the EX-5 radio from Hobby Shack, you might find that you have a deadly combination for racing.

**The following are the addresses of the companies mentioned in this article:*

Race Prep, 20115 Nordhoff St., Chatsworth, CA 91311.

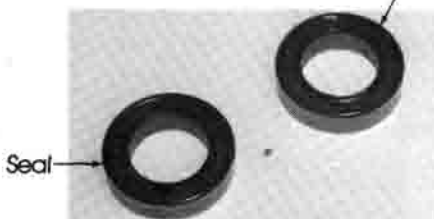
Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92728.

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BOLINK SPRINT

(Continued from page 57)

requires only a small amount of mechanical ability to have a fun and competitive oval tracker racer. This version of the BoLink car also allows for upgrading to the same suspension as their Invader race car by adding a front and rear suspension kit. A great starting point for any type of racing can be realized from this one kit. So, with cover dressing complete with the help of some flashy decals from McAllister*, Parma*, and the kit-supplied sheet, it was time to hit the track.

I've raced on dirt and asphalt before, but this sprint car was a whole new driving experience. You talk about fun, this was it. I stopped worrying about going as fast as humanly possible, instead sliding through a turn became much more interesting and challenging. I just wish there had been about six or seven

(Continued on page 86)

(Continued from page 84)

kicking out their tails wide, all almost sideways, going full bore through the turns with lots of dirt flying. It sure isn't going to take much convincing to get a sprint car class together at the local track.

Well, after having about three battery packs worth of fun, the only area of the construction I wanted to address was the manner in which the wing was mounted to the car. The original attempt at mounting the wing was done with scrap Lexan material left over from cutting out the body. This was fine for a while, but just didn't seem to be sturdy enough. After considering some other solutions, including aluminum brackets, the obvious hit me. You use body mounts to mount bodies, why not use them to mount a wing?

With the help of a Parma universal body-mounting kit the job was easy. This mounting system will even allow the flexibility of adjusting wing pitch and height. Drill three holes in the top of the roll bar cage, one in the center of the front bar and one in each of the back left and right corners. The mounting kits come with three mounts which must be cut. Making cuts on the ends opposite the mounting clip holes, cut one of the mounts down to 1 inch and the other two down to 2 inches. The short mount gets installed on the front roll bar and the longer mounts are installed in the rear left and right. Using the setscrew collars also included in the mounting kit, you can

(Continued on page 96) 96)

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Troubleshooting

by FRED MURPHY

Field Box Basics

THERE'S nothing worse: you're out at the local racing facility, your car stops running—one minute into the practice laps—and you aren't prepared to get the car back into action. Your field box, or what you call your field box, is a total disaster and the \$.10 part that will get you back onto the track cannot be found. Well, with a few dollars and a little organizing, I hope the following ideas will help.

First, find a small box to house the tools and parts. I found a \$3 fishing tackle box that had a removable six-drawer tray on top and ample room inside to hold the tools needed to perform any quick repair. The local discount store should have just about everything you'll need to set-up your handy field box.

The main tool compartment will contain all the hand tools for the track, along with a few other essentials. The hand tools are basic and all that are needed to repair most damage. Two pairs of pliers, a pair of 6-inch needle-nose and a pair of 6-inch regular pliers, will handle the gripping requirements. For wire repairs,



Small and easy to transport, an inexpensive tackle box is a good starter field box.

the box should contain a pair of small wire snips and a wire stripping tool. These two items allow for quick and clean electrical field repairs. Don't forget to include a couple of quick-connect terminal ends; they can save the day.

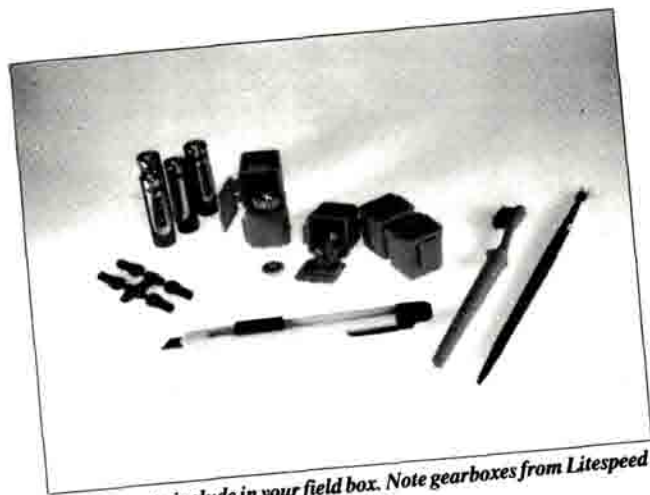
Next, screwdrivers. A No. 1 and No. 2 Phillips head along with a set of jewelers-blade screwdrivers will satisfy about 99% of the screws on any car. For that 1% that can give you a problem, I have gotten in the habit of carrying a long narrow-blade screwdriver for extra leverage on those stubborn areas. Many novice racers might say, "Well that's it," but I think we all

know better.

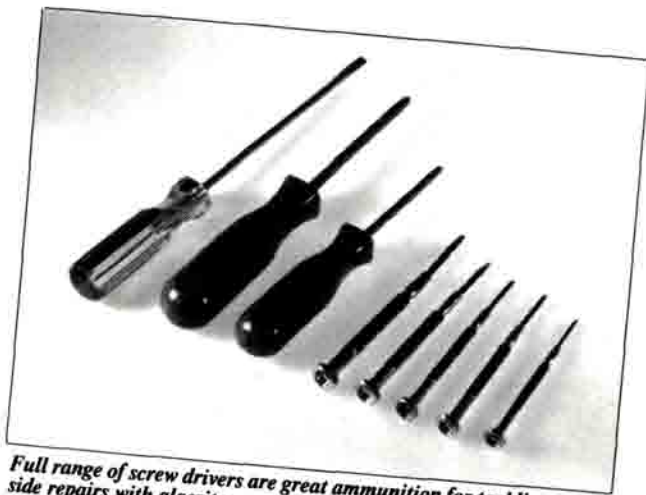
A good sharp razor should also be included in a field box. Just make sure it has a protective handle. Don't use a single-edge blade; or you might spend more time in the hospital than at the race track.

The next handy item is one that many of you do not carry: a set of files; one flat, one round, and one triangular. Did you ever strip the head of a screw because you were rushing? Well, if you had a file you could have regrooved the head of that screw and saved a lot of frustration. They have always been a handy item for me. While on the subject of filing, a small piece of emery cloth is also great to have for that dirty speed control contact.

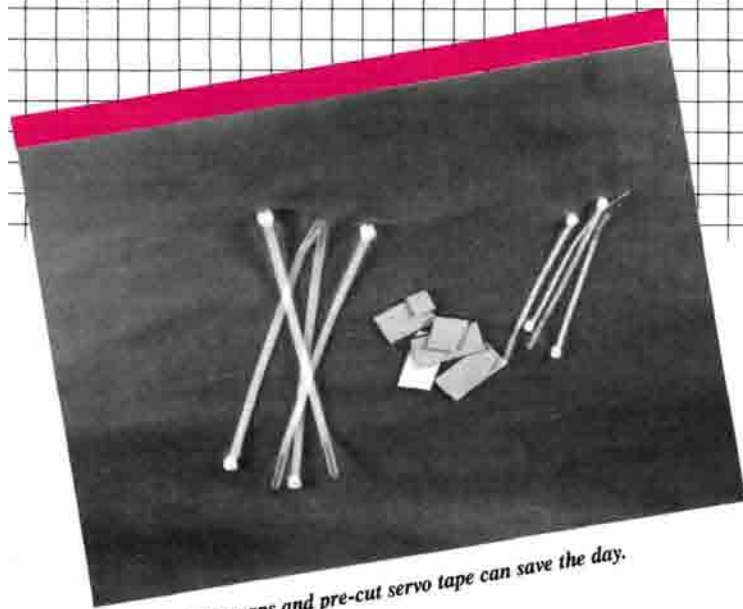
In the main tool compartment we also have an old toothbrush and a soft-bristle brush such as an old water-coloring brush. The toothbrush is good for getting that heavy dirt off the car, away from drive shafts and axles, and removing dirt from inside wheels. The soft brush is for light-duty cleaning of loose dust and dirt and for cleaning around delicate electrical components.



Basic items to include in your field box. Note gearboxes from Litespeed are also handy organizers.



Full range of screw drivers are great ammunition for tackling track-side repairs with alacrity.



Tie-wraps and pre-cut servo tape can save the day.



Pliers, wire strippers, and wire snips are "musts" for any basic field box.

Many of the tools and items listed so far are common to all households and are readily and cheaply available at any discount department store. There is no need to invest hundreds of dollars in field equipment to put a basic field box together. Start with the basics and build up from there. The basics should also include electrical tape and $\frac{1}{8}$ -inch shrink-wrap for the emergency wire repair. The other handy item to keep nearby is twist ties, one long (8 inches) and one short (4 inches). They can hold wiring, a battery pack, or even a major suspension component in place.

The last items needed in the main compartment are spare rod ends for your car. Most kits do allow for an extra rod end or two. Don't forget to include them. Another item, which I haven't had the need to use but keep just in case, is a card

of 5-mm bushings for that on-the-spot bearing replacement. Most cars use the 5-mm bushings or bearings in the wheel areas and it's a good idea to be safe. They can at least get you through the day's racing until the proper replacement can be made.

The removable six-compartment tray in the field box contains all the small items that will most likely not be used every race but whose absence can ruin a good day's performance. Once again, they're basic items: a small 9cc bottle of shock oil and a 2-gram tube of grease. Also, small pre-cut pieces of double-sided servo tape and some rubber bands should be in the tray. These things can really hold your winning day together, so don't leave them in the workshop. By the way, don't forget cyanoacrylate and a thread-locking compound.

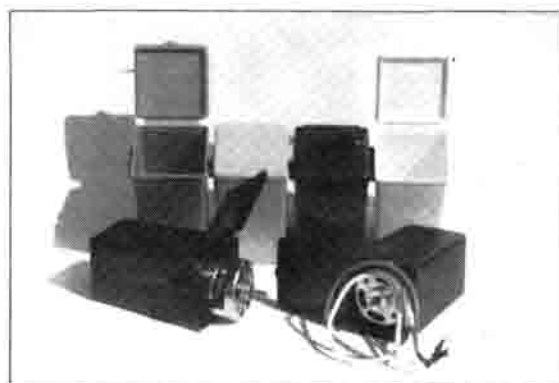
One compartment in the tray is devoted to nothing but small screws and nuts. This is where your race day can be saved. I included every spare screw and nut I could get my hands on: self-tapping machine screws and nuts, and washers (flat and lock). These little items will make or break a great performance. So don't throw away any leftover parts from your car kit, squirrel them into your field box because when you need them you'll know right where they are. Make sure you also include spare body clips and wheel nuts.

The next compartment holds extra items that pertain to the radio system. Spare servo horns and servo savers are a must for any field box. I've also made it a point to buy an extra set of crystals for my radio, for that main race with a frequency conflict. Also in the upper tray is an area for the small tools such as Allen wrenches (which all cars need) and the wheel nut wrench.

And last but not least is a compartment for a spare motor that I'm sure you won't have to use—but, just as surely, will be needed if it is not included. Now remember, this is a basic field box to get you started and, hopefully, cover the majority of your track repairs. It may not be a cure-all but should give you an idea for setting up.

Good luck and happy motoring!

Fred Murphy, c/o *Radio Control Car Action*, 632 Danbury Rd., Wilton, CT 06897.



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BOLINK SPRINT

(Continued from page 86)

easily adjust the wing to any position you desire.

With the new wing mount secure it was back to the track for more fun and excitement. And I know that as you are reading this article I'll still be at the track

a kickin' and a slidin' and having a ball.

*The following are the addresses of the companies mentioned in this article:

BoLink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

McAllister Racing, 4545-5H Industrial St., Dept. CA, Simi Valley, CA 93063.

Parma International, Inc., 13927 Progress Pkwy., N. Royalton, OH 44133. ■

MRC STRIKER

(Continued from page 81)

The rear coils on the Striker are attached by a new design in trailer arms for Tamiya. They call it a semi-trailing arm. It has a small ball-type socket on either side of the arm which provides a nice, friction-free, flexible movement of the rear suspension. This design allows for the most tire-to-ground contact possible. In our track test it made the Striker very stable in full-speed cornering, and also provided good stability upon landing after a jump. Attached to the trailer arms are a set of semi-pneumatic, spiked-tires, for that extra bite in the dirt.

The Striker's power is transferred to the wheels via a sealed gearbox with differentials. The drive shafts are made from engineering plastic with metal-reinforced inserts. Inside the gearbox there's a minimum of moving parts, and that's the key to its reliability and durability. The Striker's gearbox is comprised of a counter gear, a spur gear, three small planetary gears, and two bevel gears, making a total of 7 basic moving parts. You can't make 'em much simpler than that. The standard Tamiya plastic bushings are supplied with the kit for gearbox

(Continued on page 98)

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MRC STRIKER

(Continued from page 96)

assembly, along with a metal bushing for the counter gear. For optimum performance, it's recommended that these plastic bushings be upgraded to ball bearings. It takes 11 ball bearings to provide complete coverage for this buggy, which include the 4 for the front wheels. The friction free movement will give you extra rpm and longer life for your car.

The powerplant that's provided in the kit is the old reliable 540 Mabuchi. Attached to this is an 18-tooth pinion gear which is also in the kit. A nice feature about this gearbox is the extra motor mounting holes for putting in a 19-tooth pinion gear which'll give the car a little extra speed.

Once the gearbox and motor are in place, they're both nicely secured by rear guard that also acts as a bumper. The Striker's Ni-Cd battery is housed under the chassis, so no major operations are required to change or recharge your battery. Just flip open the battery door and the job's done.

After assembly is complete, MRC Tamiya has provided an attractive decal sheet in the kit that'll help to produce the

(Continued on page 102)

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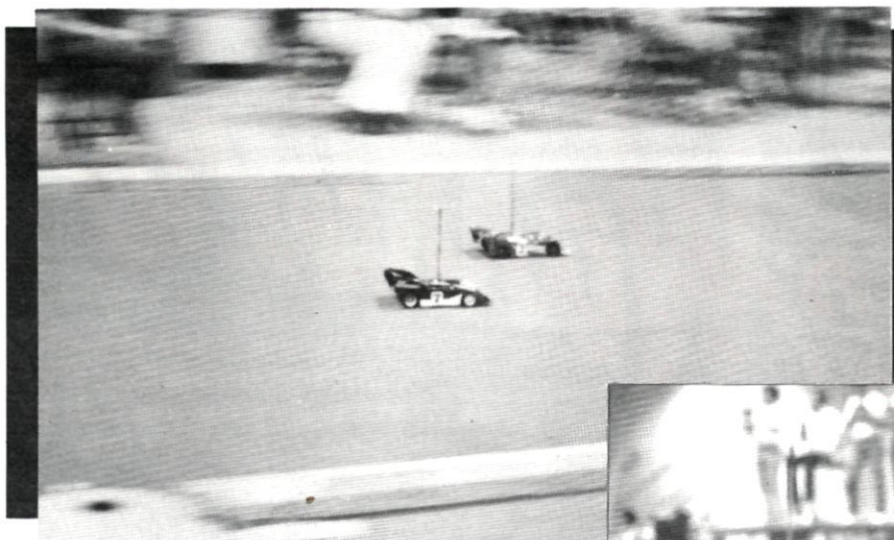
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The California

1/12-Scale

CHAMPIONSHIPS

by MIKE LEE

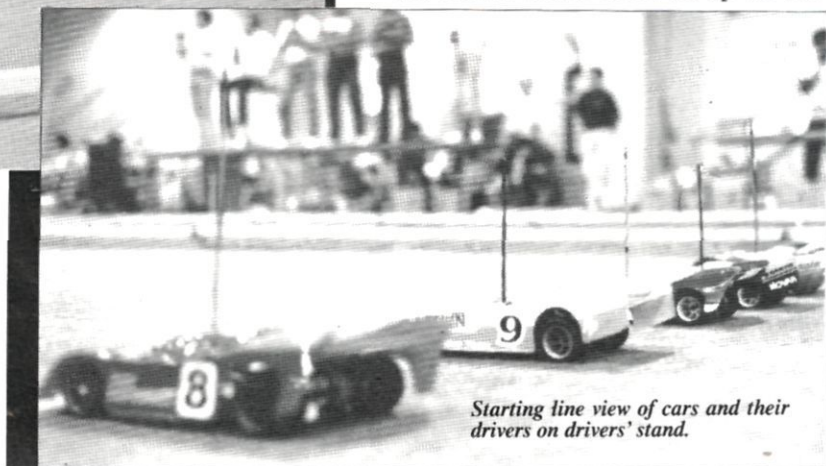


gut-wrenching crash into the restraining boards. Once out of turn four, drivers accelerated hard, but just for a second, beginning what seemed like an eternity of right-to-left and back again hairpin S-turns. The back-and-forth motion finally ended with turn nine onto a wide section just before hitting the main straight. On this section racers could set up the car

Indoor Carpet Final

FOR ANYONE WHO hasn't already heard, let it be known that California is the home of racing champions. Over half of all national champs have come from California, making it not only one of the hottest places to race, but also one of the toughest.

It's this fact that makes the California State Championships a very special race. This time around, it's the 1/12 Indoor Carpet Series, conceived and conducted by Frank Killam. Frank has been instrumental in producing top caliber races on the West Coast, and his expertise served him well in the running of this series.



Starting line view of cars and their drivers on drivers' stand.

The series consisted of three separate races in which drivers gathered points in pursuit of a series win and state championship crown. The result was three great races held in conjunction with major automobile shows, and utilizing three tough track layouts for each race. The race I'm covering is the final race of the series; the one in which the contenders went for broke.

Let's take a look at the track real quick and see what the drivers were up against. Starting from the back straightaway, the cars gathered up a good head of steam on about 120 feet of smooth indoor turf. Turn one wasn't easy, since it was an 180° hairpin. Out of the hairpin, drivers swung wide and headed for the tight S-turns of numbers two, three, and four, while feathering the throttle. There were corner dots at each corner, and a sharp cut inside of them rewarded one with a

coming from the wide exit from nine and slowly cut to the inside while getting on the gas. They then swung close to the board at ten and cut loose on the straight toward number one again.

It was a fairly fast track, but one that demanded every bit of a driver's attention.



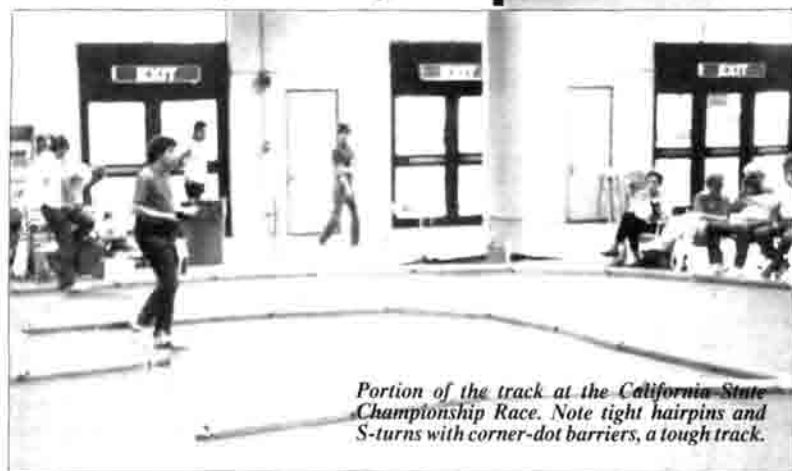
Victors in Expert, from left, Sanyo Batteries' "Big Jim" stands by 1st-place Tony Neisinger, Shawn Ireland 2nd, and Kevin Mercadante 3rd.



Intensity of the start is evident on the faces of these top expert drivers. Winner Tony Neisinger is closest to camera.

All the cars were fit with modified-type motors, with anything goes for radio and bodies. Previous series races were mostly GTP- and the Can-Am type cars. An Indy car body was contemplated, but the risk was considered a bit high.

Racing commenced on Friday, March 27. Over 5 rounds of qualifying heats were run on Friday and Saturday, and



Portion of the track at the California State Championship Race. Note tight hairpins and S-turns with corner-dot barriers, a tough track.



Concours winners, from left: 1st Kent Clausen, 2nd Dave Cochrane, 3rd Jason Thompson.

concluded on Sunday the final day of racing. It was great being able to mingle with fellow drivers, and seeing all the great custom cars. With a whole building chock full of them, it was easy to browse around between races.

Three classes of drivers were represented. In the Novice class, Wayne Breault was the top qualifier, making the top A-Main race. In the B Main, Jim Giordano was the top man for the pole position.

From the very start of the B Main, young Joey Citro shot ahead of the pack and never let up. This kid is just shy of 13 years old, but cool as a cucumber. He dominated the race, wasting four other drivers behind him. In second was Doug Tate, who started in last position and worked his way up, third was Al Sikorsky.

In the A-Main race, the Novice drivers provided the excitement. Second qualifier

Dean McCarty took the early lead but had a whole bunch of guys barreling down on him. He succumbed to the pressure, and Dave Cochrane took the lead at 1 minute. He kept it for a bit, but lost it to the top qualifier, Wayne Breault, at 4½ minutes. Wayne took firm control



Melissa Lee stands in front of some of the hot cars surrounding the R/C track.

from here and went on to take the checkered flag.

In the Amateur class, the B Main started out with Fred Hohwart in the lead for a couple of minutes, only to choke on a corner dot letting Jake Gutierrez take over. Jake enjoyed that spot for another 4 minutes until he also choked on a dot, and let Kirby Criger through. Kirby was doing great for a minute until he got caught in traffic and choked on someone's rear end. That made things really interesting because three cars were all on the same lap and gunning for it. Somehow, Kirby picked his way through the mess and came out the winner. Hohwart came in second, and John Rushing came charging in from nowhere to take third.

The A Main race was completely dominated by the top qualifier, Kenny Koch. Kenny dropped the hammer right

(Continued on page 140)



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MRC STRIKER

(Continued from page 98)

final dressed and ready-to-race buggy.

The Striker is a basic entry-level off-road buggy that'll give the beginner a good introduction to R/C. I think you'll find that some suspension modifications will be for the better—better for both the car's performance and your enjoyment.

The Striker gives a new look to the MRC/Tamiya line with its sleek formula styling. A look that'll cover a lot of ground rather quickly.

**The following are the addresses of the manufacturers mentioned in this article:*

MRC/Tamiya, Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

Parma International Inc., 13927 Progress Pkwy., North Royalton, OH 44133. ■

KYOSHO SALUTE

(Continued from page 70)

As always, my first run was on the asphalt street in front of my house. The usual pit crew accompanied me: Johnny, age twelve, switch and battery man; Tony, thirteen, adjustment and clean-up man; and my lovely wife, Edeet, traffic-alert coordinator. Edeet gave us the coast-is-clear signal and Johnny placed the car down and switched on the power. I then maneuvered the car to a starting position and buried the throttle. The Salute layed down four streaks of Bridgestone rubber and shot down the block. Johnny, Tony and Edeet expressed varied looks of surprise.

With no time to waste, we picked up the car and headed for the local dirt track, where we repeated the street scene.

The Salute has an incredibly high top end and the quickest acceleration of any

car I've ever seen. The four low-profile Bridgestone off-road racing tires clawed deeper and deeper, enabling the Salute to conquer any terrain. The highlight of the car's performance was the way the high-tech suspension system handled the track's jumps and bumps. It simply absorbed everything in its way without any signs of jolting or stiffness, landing smoothly jump after jump.

As mentioned, I chose the 18:19 differential gear ratio. The car not only climbed every incline and jump with wrenching power but the ratio improved the cornering and steering performance. Initially, the car leaned somewhat into the wider turns, so I decided to take a second and rolled into the pit area where Johnny quickly readjusted the front and rear stabilizer bars to a stiffer setting. I was out in less than 30 seconds. With these new adjustments and the Salute's already-low

(Continued on page 104)



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KYOSHO SALUTE

(Continued from page 102)

center of gravity, the car seemed to be sucked into each turn without the least bit of sliding or leaning.

To say the Salute was exciting to drive is a gross understatement. The car delivers the kind of performance that serious R/Cers expect from a competitive racing machine. There are a few mentionable options, obtainable from Kyosho's Option House, that would enhance the Salute's performance. There's an array of racing tires designed for any track condition as well as the new line of pinion gear racing clutches with different numbers of teeth. I recommend using the optional side and motor guards to protect the car from jealous kamikaze-type rivals.

**The following is the address of the company mentioned in this article:*

Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820. ■

RED PRINCE

(Continued from page 40)

Now that the Red Prince kit is complete, the next step is to gather the Frog parts, and the shocks which are not included. As stated earlier, the Red Prince requires four short shocks, which I obtained from two sources. The front shocks are a pair of RC10 short shocks from Associated Electrics*, the rear shocks are Option House's gold shocks (short) from Kyosho via Great Planes*. These are the identical shocks that are on the front of the Turbo Optima.

From Project Frog Part II, the following components have been transplanted: the Frog gearbox containing the Thorp Manufacturing* differential along with the stock swing arms; the Team Losi* Revolution II powerplant; the stock front upright set; the CRP* front suspension arms; and the Pro-Line* tires and wheels.

You'll notice that there hasn't been

any mention of speed controller transplant. This is another big performance change that's been added to the Red Prince. I used the Super Zeta model ZS-1A from Product Design*. This electronic speed control is a completely sealed unit designed to keep out dust and dirt. The Super Zeta came out of the box with a Tamiya-type battery connector, an in-line 30-amp fuse, and Futaba* receiver connector. All I had to do was connect the motor and put the juice to it. Some folks made comments about the Zeta's size. It may be a bit larger than some electronic units, but the performance factor of this unit is well worth the slight increase in size.

Assembly of the Red Prince kit goes very smoothly using the hardware supplied, but make sure you keep the screws and nuts from your Frog because you'll need them to mount the shocks. Hot Trick Racing provides you with an assembly diagram which outlines the

(Continued on page 106)

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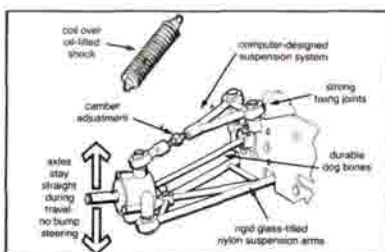


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RED PRINCE

(Continued from page 104)

basics, but don't be afraid to improvise with the kit to suit the components you're using.

The kit recommends using the RC10 battery box, but I elected to use only half of a battery box and a rubber band to secure the other side of the battery. Velcro was used to mount the speed control to the speed control tray, and the receiver was mounted under the tray to the chassis floor, also using Velcro. The steering servo was secured to the chassis floor with the servo tape, but you may elect to secure it with a tie-wrap by making additional holes in the chassis. You'll also have to drill out the shock-mounting holes in the Frog's rear swing arms to allow a longer mounting screw to be added.

After the assembly was complete, the finishing touch was the addition of a Parma* Eagle body with wing. The body gets trimmed on the stock trim lines with some minor trimming in the front shock tower area and around the motor to insure a good, clean fit.

The body is secured to the chassis using the Velcro supplied with the Red Prince body mounting kit. This mounting system allows quick, easy removal and mounting of the body which can be important on race day.

All these fancy trick parts are fine, but the real test is on the track. RPS* Revolution II motor was still equipped with the 17-tooth pinion gear from the Project Frog Part II car. The Red Prince pulled away from the starting line very smoothly, but when the throttle was opened up all #!#! broke loose! The throttle response from the Zeta speed

control was just incredible, and that goes for braking also. But the power transfer to the rear wheels seemed too much. With a small let up on the differential tension I made another attempt to attack the track. With a little more slip in the differential the power transfer was much better and smoother. Handling capabilities of the Red Prince are like night and day after having driven a stock Frog. The center of gravity on the Hot Tric setup is much lower and with a 9-inch width between the front wheels, steering, and handling stability is exceptional.

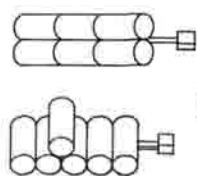
The Red Prince was also very stable in cornering and jumping, where the stock Frog has a tendency to be very loose and quite top-heavy due to the high center of gravity in the original design.

The transformation of the Frog into:

(Continued on page 110)

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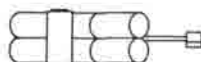
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NOTHING ADDS more to a model race car's appearance than a scale paint job, proper numbers, and sponsor logos. The bright colors, brand names, and slogans are as much a part of today's racing scene as the cars and drivers themselves. Indeed, most of today's racing operations wouldn't be in the limelight as often if it weren't for the sponsor's financial support. Some of the flashy paint jobs you see nowadays cost the sponsoring organization over a million dollars a season. But you can duplicate these paint schemes or create your own quickly and inexpensively by following a simple method.

These days, you can usually find the right body style which will allow you to duplicate almost any championship race car. Recent issues of *Radio Control Car Action* listed both the types and scales by groups of Lexan shells available. Re-

cently, a few more have been released to fill the gaps. If you've got a favorite car in mind, get some recent color photos, or video-tape part of a televised race to build a reference file. For stock car fans, *Grand National Illustrated* magazine, and its weekly newspaper cousin, *Grand National Scene* from Griggs Publishing*, have loads of great photos to work with. Check out your local newsstand, most carry a good selection.

Let's begin with basics. Imagine the race car you'd like to duplicate stripped of all its numbers, lettering, and decals. The paint job itself appears quite simple, save for some of the more exotic drag cars. The reason for this is because a race car will invariably need touch-up or repairs to its body. Even running at the head of the pack and avoiding wrecks won't keep it neat. The sandblasting effects of a few hundred miles worth of track dirt will wear the paint off. Most professional teams are prepared to repaint the entire car right at the track. Your sponsor won't

be around very long if you race a grubby-looking car all the time.

Assuming you've already got your chassis set up, trim and mount the body while it's still clear. This way you can check clearances and adjust the mounts until it fits right. Hopefully, you've been reading this magazine long enough to know how to mask off the windows, prepare the body for paint, and apply the paint itself. After the paint is dry, you're ready for the *real* finishing touch.

While you're building your reference file, keep your eyes open for some advertisements featuring the sponsor you'll need. I found the ad for the Kodak car lettering in a photography magazine, and the logo for the Tide car was on a label I soaked off from a detergent jug. If you're really fortunate, you'll find a large side-view of the car which will allow you to easily duplicate the numbers.

When you've got what you need, locate a copying machine which can enlarge or reduce your copies. If your school, library, or office doesn't have one, usually banks, stores, or printing shops will. Enlarge or reduce the logo to the size you desire, even if it means copying a copy to get it



The vellum artwork created from enlarged samples alongside.



Tide logo was copied from a label soaked off a detergent jug.



The characters have been cut out and applied to a sheet of Black MonoKote.

large or small enough to use. It's best to start with the logo that's closest to the size you need, as continuous reproduction from copy to copy will result in loss of clarity. Naturally, you could have this process done photographically, but the idea here is to keep the cost down.

Step two involves getting hold of some tracing paper or "drafting vellum," and carefully tracing the outline of the lettering from Xerox copies. Use a soft pencil, No. 1 or 2, and be as neat and accurate as possible. Use a straightedge or drafting templates if available, because any sloppy work here will be carried all the way to the finished product. Don't be disappointed or discouraged if you don't get it exactly right the first time; it becomes easier when you practice awhile.

If you were fortunate enough to find the right numbers and have copied them, trace them onto the vellum. You only need to make one pattern for each size of letter sets and numbers you use. By the way, don't overlook the decals used in plastic model car kits. These can be enlarged to the right size on the copier. An old kit might have just what you need. Race car numbers like Richard Petty's famous No. 43 have gone unchanged for decades, even though the car's colors and sponsors have changed.

If you can't find numbers to copy, you'll have to get as close as you can by hand. Carefully lay the lettering over the body to check the fit. What appears right for a full-scale car might not fit perfectly on some R/C bodies, and you might have to make some minor adjustments to give it the look you want.

The next step is to visit your local hobby shop and examine the selection of Top Flite's* MonoKote Trim Sheets. This material is a very thin layer of colored Mylar film with a peel-off adhesive

backing. The vast selection of colors should allow you to match most letter and number colors found on race cars. Some of the older sheets have instructions and diagrams on the backing sheet, but try to use the kind with the plain backing material. Tape the MonoKote face down on a hard, smooth surface, using small pieces of masking tape at the corners. Also lay the vellum artwork face down over the MonoKote, and tape this in place to keep it from shifting. Since the MonoKote is in 40x5-inch strips, you'll probably have to move the vellum around from word to word, to allow you to get it all on. Trace over your pencil lines again with a soft pencil and whatever drawing aids you have available. This will transfer the outline to the MonoKote backing sheet in reverse image. If for some reason it doesn't transfer, try it again with some carbon paper.

After you've done all the tracing (you'll need duplicate sets for both sides of the car), you're ready to cut out the letters. Scissors will work okay, but the best results are obtained with a new X-Acto blade and a piece of glass. Lay the MonoKote face down on the glass and carefully cut along the outlines with the knife. Cut the curved portions free-hand, and use a metal straightedge to follow up cutting the straight sections. Make sure the corners are cleanly cut so that you don't tear them removing the letter from the sheet. If you use scissors, you'll have to cut out the middle of some of the letters with a knife, and you'll have to experiment in order to find out how to cut them without leaving ragged edges.

Now, lay the letters on the body to see how they look. When you're satisfied with the fit and the spacing, go ahead and stick them on. Wipe a mixture of soap and water on the area where the char-

acters will be applied; this will allow you to slide them around like decals to get the proper positioning. Go slowly, doing a word at a time, and squeegee out the air bubbles with your fingertips. Blot with a paper towel, and go on to the next word or set of numbers, repeating the soapy water and squeegee procedure as you go. When you're all done, and the water has dried, you'll have a permanent lettering job and a hot lookin' car!

On "Tide Ride," the logos were cut from dark blue stock, with red dots over the "i," and the No. 17 is white with a blue outline. To get outlines on letters or numbers, first cut the character out of the main color and stick it on a piece of MonoKote corresponding to the outline color. Next trim along the edge of the first color, leaving just enough of the second color to give the desired outline. Peel this off and stick it on the car. Even though this is double thickness, the Mylar is so thin that it won't be noticed.

The Kodak logo is red MonoKote with a black outline, as are the numbers. I did the colored bars along the quarter panels with blue and red stripes on a black background. I cut out entire letters for the back fenders and pressed them in place, and later trimmed the parts that stuck out into the wheel cutout with a knife. I cut chrome bumpers and trim from Chrome MonoKote, and the small decals are from Autographics* sheets.

*The following are the addresses of the companies mentioned in this article:

Griggs Publishing Company, P.O. Box 500, Concord, NC 28026.

Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, IL 60616.

Autographics of California, 1700 14th St., Bakersfield, CA 93301.

RED PRINCE

(Continued from page 106)

Prince was a major success, one that's going to surprise quite a few competitors at the track. I've been thoroughly convinced that fables can become reality,

and you will be too!

**The following are the addresses of the manufacturers mentioned in this article:*

MRC/Tamiya, Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

Hot Trick Racing Cars, Inc., 1157 Cushman Ave., San Diego, CA 92110.

Associated Electric, 3585 Cadillac Ave., ve., Costa Mesa, CA 92626.

Great Planes Model Distributors Co., P.O. Box 4021, Champaign, IL 61820.

Thorp Manufacturing, 380 S. East End, rd Unit H, Pomona, CA 91766.

CRP, Custom Racing Products, 3520 El Camino Real B3, Dept. 6-F, Atascadero, CA 93422.

Pro-Line, P.O. Box 456, Beaumont, CA 92223.

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PARMA MUSTANG

(Continued from page 78)

supplementary instructions. After this is complete, the upper and lower wishbones, front and rear anti-roll bars, fiberglass chassis plate, and bumper are assembled and connected to the chassis. Then the steering apparatus and dog bones are assembled. When you assemble the dog bones the instructions state that the pins be cemented in place.

This is a step which I neglected and on race day I paid for it, as two of the dog bones made their departure from the chassis. Needless to say, I'd recommend taking the time to complete this step.

Next, the shocks are assembled and installed, followed by all the electronics. The kit includes two battery clamps with pins that the battery leads are supposed to be connected to. The pins transmit the current through the connector in the chassis to the speed control. I chose not to use this system because it makes battery charging more of an ordeal than it should be. One thing these pins do provide is a great fastening system for your battery. Once these steps are complete, all that remains to be done is to paint the body

(Continued on page 115)



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PARMA MUSTANG

(Continued from page 112)

and assemble the tires.

I painted the body with MRC/Tamiya* paint thinned with alcohol, and decorated it with some Coors decals from Autographics*. The Revtech decals, also from Autographics for Revtech, were used to warn the competition as to just what kind of motor this wild bronco had.

PERFORMANCE. Before running the Mini Mustang, the two-speed transmission needs to be adjusted. The instructions recommend adjusting the transmission so that the car will shift into second gear within the first 8 feet. I found this to be a good estimate, because with such a low gear ratio in first gear (7.78:1 with 11/17 pinion), it winds up very quickly. The gear reduction in the chassis is 2.33:1 and the overall ratio in second gear is 5.51:1. Other pinions are also available for the two-speed transmission in the 12/18 to 15/21 range. Once this adjustment was complete, I headed for the race track.

After recruiting Bruce Butler, one of the most talented drivers in my area, I gave the Parma matched Sanyo 6-cell pack a charge and cleared the track for the photo shoot. A number of spectators watched as Bruce literally tore up the track. The Mustang, because of its two-speed tranny and light weight, had blinding acceleration. And with the help of the over-size coil-over shocks, it was able to negotiate the berms, hairpins, and tabletops effortlessly.

After we had shot all the photos, Bruce asked for a chance at running the Mini Mustang in the four-wheel drive A-Main. Because I arrived too late to qualify, the Mustang was placed at the back of the pack for the start.

Getting off to a late start, Bruce and the Mustang began reeling-in the front runners by the second lap. Unfortunately, an oversight in the assembly process had caused one of the pins in the dog bones to float out of its resting place, causing the dog bone to become dislodged from its retaining cup. This sidelined the Mustang for the rest of the day, but it was quite obvious that this was going to be the car to beat in the future.

I took the Mustang home to prepare it for opening day races at the BORRCA track. There weren't enough four-wheel drive Modifieds to make a decent heat, so I picked up a Race Prep* Dyno Stock motor to qualify for the four-wheel drive Stock class. I installed the motor and readjusted the transmission to compen-

(Continued on page 119)

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Aerodynamics

by RICH HEMSTREET

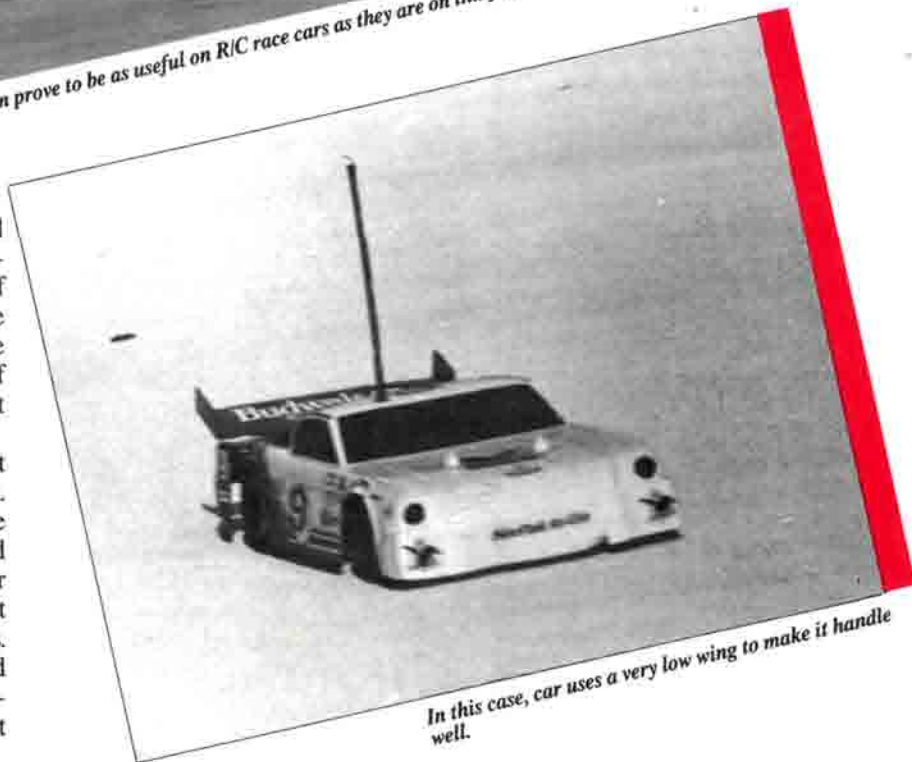


photo by DANIEL J. PUSATERI

When set up correctly, wings can prove to be as useful on R/C race cars as they are on this full-scale Jaguar GTP.

IN PART THREE of this series, I'll discuss "downforce," which is directly related to the amount of traction your racer will have. The easiest way to increase downforce would be to strap a brick to the roof of your car. You'll have great traction—but overall performance would suffer.

How do you add traction without compromising performance? You can't. There'll be a tradeoff between downforce and increased drag. But you can add downforce without adding weight to your car. Weight increases downforce, but adds handling and performance problems. Through aerodynamics, you can add downforce without adding mass. Aerodynamics adds downforce only when at speed.



In this case, car uses a very low wing to make it handle well.

Wings, spoilers, and diaphanes are used to create downforce. A wing is mounted above the body surface, while a spoiler is attached directly to the car's body. A diaphane attaches to the front of the car, below the bumper. In most cases, the use of spoilers, wings, and diaphanes is governed by the rules for car bodies. The sizes of spoilers and the use of wings are restricted.

The diaphane helps to keep air out from under the car, while also forcing the air to go over the top of the car. A diaphane can also be angled to increase the downforce on the front tires when at speed.

The spoiler at the rear of the car will increase the downforce on the rear wheels. Spoilers can be made out of Lexan sheets. You can use servo tape to attach the spoiler to your car. Start with as tall a spoiler as you are permitted, and then cut the spoiler down as you run the car, until you have the right amount of traction in the rear. The taller the spoiler, the greater the drag generated.

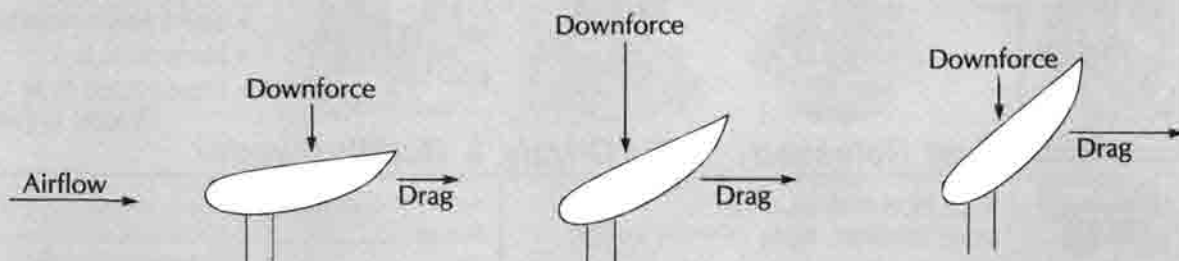
When you can legally use wings, they're the most effective source of downforce generally available. Wings are mounted high enough to avoid their being affected by air turbulence passing over the car's body. Wings are usually adjustable in angle of attack, in fore and aft positioning, and in height above the car.



This Associated Formula II car has the rear wing mounted way back so that it's in clean air.

One way of increasing the effectiveness of a wing is to add side dams to the ends of the wing. This has the effect of increasing the width of the wing because it forces all of the air to go over the wing; it doesn't let the air spill off the ends of the wing.

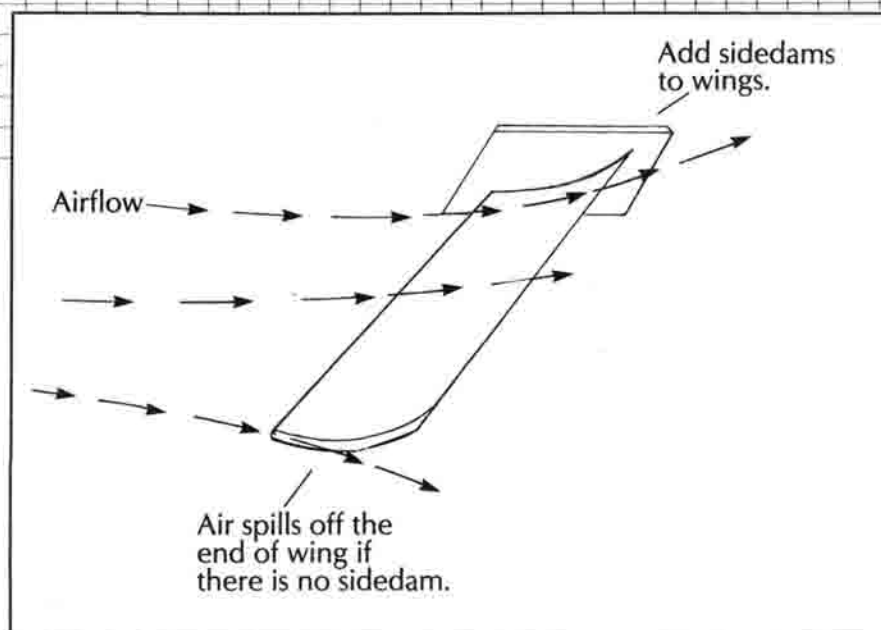
The steeper the angle of the wing, up to 45° , the greater the downforce and the greater the drag. If you go past 45° , you are simply creating an airbrake on your car. Try to run your wing as flat as possible, to keep from creating excessive drag.



Different wing angles produce different amounts of downforce and drag. Length of arrows show approximate relative forces.

By moving the wing forward and back, on its mount, you can move the downforce around. If your car is understeering at high speed, try to move the wing forward, to increase the front-end downforce. When you move the wing back, you're concentrating the downforce on the rear of the car. The higher the wing, the greater its effectiveness, and once again, the greater the drag. If your car is handling well with the wing flat, try going to a smaller wing, or removing the wing altogether.

The ultimate solution in full-size racing is ground effects. That's where air is channeled under a car through a side pod, creating a vacuum effect that draws the car to the track. Only the 1/8-scale MRP* Pro 180 gas racer has a ground effects pod at this time. The car is a two-wheel drive pan car with no suspension. Full-size ground effects cars have limited suspension travel so the sidepods stay at a proper working level from the track.



Ground effects also increases drag, but the amount of available downforce is great. Also, you don't have to dial-in ground effects—they're designed into the chassis.

Remember, aerodynamics is a very important aspect of R/C race cars. The faster cars go, the greater is the contribution from aerodynamics. By using wings and spoilers, you can fine-tune your car's performance. As R/C racing

grows in popularity, the technology of applied aerodynamics will play an even greater and swifter role.

Rich Hemstreet, c/o *Radio Control Car Action*, Wilton, CT 06897.

*The following is the address of the company mentioned in this article:

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PARMA MUSTANG

(Continued from page 115)

sate for the slower motor speed. Due to rainy weather, we only had time for one round of qualifying, in which I took second place. After the weather cleared, we began to run the Mains. I was in the A-Main running against an Optima and a Turbo Optima with a stock motor. At the start, I jumped the gun by about a second, and was penalized a lap. Now I had to make up some ground.

After the sixth lap, the Optima was sidelined with mechanical problems and I was on the heels of the Turbo Optima. I continued to lap the remaining competitor until about 30 seconds left, when he dumped his battery because of the high traction. By this time, I had lapped him 4 times and from there on it was smooth sailing.

This is one car that's not getting out of my hands. Without a doubt, the PB Mini Mustang is the fastest four-wheel-drive car I and many other folks have ever seen. It has some minor problems, just as any other car involved in competition, whether R/C or full-scale might have. And don't expect the Mustang to be maintenance-free either, as with all other R/C cars it

requires extensive maintenance to keep it ahead of the pack.

Just remember when you're up against a Mini Mustang, and your heart skips a couple of beats. It's for a good reason, because you're in for some deadly competition!

**The following are the addresses of the companies mentioned in this article:*

Parma International, Inc., 13927 C Progress Pkwy., North Royalton, OH 44133.

Hobby Shack, 18480 Bandelier Circle, Dept. CA067, Fountain Valley, CA 92728.

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Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, IL 60084.

MRC/Tamiya, Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, NJ 08817.

Autographics of California, 1700 14th St., Bakersfield, CA 93301.

R/C Race Prep, 20115 Nordhoff St., Chatsworth, CA 91311. ■

DIFFERENTIALS

(Continued from page 50)

wheel. This will cause the balls to ride against the washers, which will smooth out slight roughness.

Check your differential after each run.

When it starts to get rough or tighten up, tear it down, clean it up, and start over.

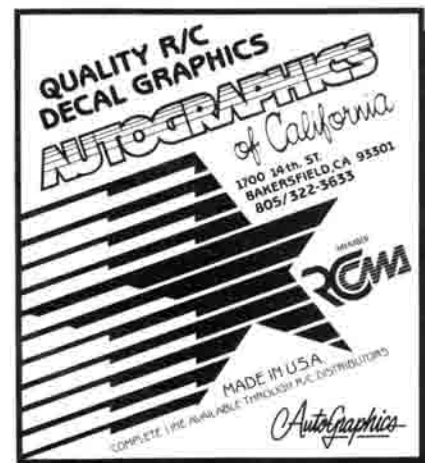
Good racing to you!

**The following are the addresses of the companies mentioned in this article:*

TRC, P.O. Box 478, Oakboro, NC 28129.

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GRAND NATIONALS

(Continued from page 54)

The second-place car, with 438 laps, was the Novak Electronics team of Jay Halsey and Bob Novak. Their Predator used a Reedy* motor, and Novak speed control. Third was the Composite Craft team of Kim Davis and Jeff Davis. Jeff designed the Predator that finished first through fourth in the 500-lap event. That team completed 424 laps using a CAM motor and Tekin* speed control with Team Losi* 1/8-scale tires.

On Saturday, the BoLink Pole Position qualifier heats began. The 1/12-scale amateur classes ran 8-minute heats while all others ran 5-minute heats. BoLink R/C cars provided trophies to the top three qualifiers in each class.

Lake Whippoorwill Speedway is fast, and it's not necessary to do a lot of things to make your car handle. The primary thing is to use a wing on sleek-bodied race cars such as T-Birds or Oldses, and a spoiler on blunt-nosed cars like Monte Carlos and Mustangs.

Most of the cars were all set with stock configurations. In 1/10-scale there were Predators, BoLink Invaders and Round-Trackers plus some home-builts and others using RC10 parts. In 1/12-scale, TRC Pro12s were predominant, with some Associated* 12i and 12Ls, BoLink Banditos and Deltas. The track is so smooth that you can get most any 1/12- or 1/10-scale road car to work.

The BoLink Pole Position Amateur winners were Bob Fensterer in 1/12-scale Stock, Bob Sumner in 1/12-scale Modified, Chris Powers in 1/10-scale Stock, and Richie Schaeffer in 1/10-scale Modified. The top Invitational Class qualifiers were Jim Fuller in 1/12-scale and Buddy Bartos in 1/10.

Saturday evening featured the Reedy

Speed Run for the Invitational drivers. Each racer had two minutes to run as fast as he could by himself. In 1/10-scale, Jeff Davis won the trophy with a 6.67-second average lap time, and a best single lap of 6.013 seconds.

Buddy Bartos had to make two runs in 1/12-scale. The computer couldn't keep up with him on his first run! After re-adjusting the computer, Bartos averaged 6.01 seconds per lap with a single best lap of 5.90 seconds, to win the Reedy Speed Run Trophy.

At the racers' banquet on Saturday

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night, Buddy Bartos was nicknamed the "Legend of Lake Whippoorwill," because of his domination of the Novak 500 and beating the computer in the Reedy Speed Run.

On Sunday, the Grand National Stock Car Championships were held. The festivities commenced with a skydiver, mass balloon release and the introduction of Miss Whippoorwill, Rahslyn Mitchell, the speedway's trophy girl. By the end of the day the championships were decided. The Florida drivers shut out all others on their home track. The amateur class A-mains went to Robert Bazin 1/12-Stock, Bob Sumner 1/12-Modified, Chris Powers and George David in the 1/10-Modified class.

Jim Fuller from Orlando beat out

Buddy Bartos from Amherst, Ohio, in the 1/12-Invitational class while Jeff Davis from Orlando beat Bartos in the 1/10-Invitational class.

Lake Whippoorwill International Speedway put on a great event. Promoter Bob Hosch had about 30 people running the races. Buddy Bartos, former 1/12 World champion, said "It's the most fun I've ever had at a major race." That's because of the way this race is organized and run.

Be sure to make plans to attend the upcoming *Radio Control Car Action Weekend* on October 1-4 at the Lake Whippoorwill International Speedway.

*The following are the addresses of the companies mentioned in this article:

BoLink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

Team Losi: RPS Distributing, 1655 East Mission Blvd., Pomona, CA 91766.

Novak, 128 East Dyer, Santa Ana, CA 92707.

Reedy, 3585 Cadillac Ave., Costa Mesa, CA 92626.

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ASSOCIATED RC12L

(Continued from page 61)

with a single fiberglass tongue. Two tongues are furnished, one thicker than the other, again to allow tuning of the car to different track conditions. The tongue is mounted with a unique ball-link connector that allows very free side-to-side tongue movement. This will provide half

(Continued on page 128)

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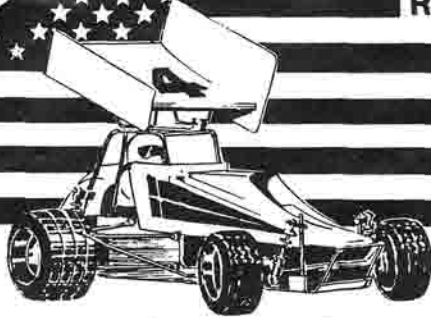
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ASSOCIATED RC12L

(Continued from page 121)

of the rear suspension.

The rear unit is mounted to the tongue with large countersink screws. The rear end contains the aluminum motor mount (again for light weight), nylon end plate, axle, and motor. Once the rear end is mated to the main chassis, you can see how the suspension works. The rear pod is allowed to float and move separately from the main chassis and it takes its own punishment. Small adjustment screws at the front of the tongue allow only limited movement and even offset for circle track racing—a well-thought-out arrangement.

The forward and rearward movement is taken care of with a top-mounted suspension spring, as with previous 12-series cars. It is assisted by two large disk plates that have spring tensioners. Here you can see how the suspension move-

ment is dampened and limited. The disk plates are adjustable in spring tension, which makes more or less friction on the rear end's upper plate. The friction causes faster or slower movement of the rear end, and gives the suspension. It's simple and effective.

At the motor and axle you'll find the familiar ball differential. There's not much difference here from previous 12-series cars, except the position of the motor and rear end; they're more centered on the chassis than before, making the car more balanced forward to aft. The motor compartment is a bit more snug than before, but nothing the average guy can't handle with his bare hands.

In order to make the rear end more centered, the axle needed a bit more spacing than before, and here we find a large aluminum axle spacer. In it the first of the rear ball bearings is found. The rest are scattered about the rear axle, giving

ample support where required.

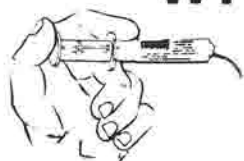
The graphite rear axle is the lightest one available, and is supported in new axle mounts. The kit comes with several mounts, each set with a bit different axle position, allowing you to adjust the ride height of the rear chassis. To most drivers, this will mean longer tire life. With new tires, set the ride height low. As the tires wear down, you can jack up the rear end with axle mounts. Neat.

Finishing off the rear end are the tires and wheels. Like the front rims, the rears are newly designed of lightweight construction. You might have noticed I've used the word "lightweight" a lot. Associated doesn't mess around when they want to keep weight to a minimum.

Now for the radio. Note that you'll need three things to make the RC12L work—a mini receiver and servo, and an electronic speed controller—and there

(Continued on page 138)

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ASSOCIATED RC12L

(Continued from page 138)

cornered. Overall, the 12L is a real treat to drive.

No doubt this car should enjoy a long racing life. The Associated 12L is a great car to race with, providing plenty of chassis adjustment for virtually any track condition. It seems that it will fit any

situation once you learn just a little handling ability. Even if you're not a serious road racer, the 12L makes a great road blazer just for the fun of it.

Progress marches onward once again in the form of the new world championship car, the Associated RC12L.

**The following are the addresses of the companies mentioned in this article:*

Associated Electric, 3585 Cadillac Ave. Ave. Costa Mesa, CA 92626.

Airtronics, Inc., 11 Autry, Irvine, CA 92718.

Pro Auto Peak - \$34.95

A Revolutionary Concept in Charging Technology

Δ Peak Detection Converter

- Instantly Converts ANY DC. Fast Charger (even charge cords) to a Peak Detection Charger
- Provides Increased Power & Run Time
- 100% Safe and Automatic
- Compact Size 3x2x1 1/4"



Both Units Feature:

- Use with Cars, Boats, Planes
- Tamiya Connectors
- One Button Operation
- LED Indicator
- Electronic Detection Circuitry
- Built In Self Test Routine • Automatic Switch to Trickle Charge

Available thru local dealers or from The Pro Shop, P.O. Box 5382, Parsippany, N.J. 07054
Include \$2.00 P&H-N.J. residents add 6% sales tax-check or money order only-no C.O.D.

Distributor Inquiries Invited

Pro Power Peak - \$49.95

- Self Contained DC. Peak Detection Charger for 6 or 7 Cells
- Transistor Current Regulator
- Pulsating LED Charge Indicator

1/12 CHAMPS

(Continued from page 101)

at the start and didn't bother looking for trouble. He let everyone know who owned this class by leading from start to finish. In second place, Roger Vorba managed to hold out against some pretty mean competition. Barbi Smith wasn't out to charm the leaders when she made her move toward the top. At one point, she stole the second place position and held on for a minute, before a mechanical failure forced her to quit. Donald Bossett also took a shot at the lead, coming from the rear to take second place, but ate it 30 seconds from the finish line and had to settle for third.

(Continued on page 144)



APPROVED BY
IRROQ

PACESETTER
PRODUCTS, INC.



THE ORIGINATORS OF QUARTER SCALE R/C RACE CARS

THE VAPORIZER

The Ultimate In True 1/4 Scale R/C Drag Racing

This awesome 7" model of a current top fuel dragster is 7" long and 15" wide. The Vaporizer can reach speeds of over 100 m.p.h. real speed (400 scale).

Car features: All tubular painted steel frame, streamline fiberglass body, dual in-board disc brakes, rear spun aluminum wheels with custom front mag wheels, all precision ball bearings and a centrifugal clutch for easy starting. The Vaporizer comes with either a 2.3hp or 4.0hp Quadra 2 stroke engine and rear wing.

Options include: 4.0hp Quadra engine, working heddors by Jose of Hedman Heddors, working parachute, racing oil, racing engine, and high volume air cleaner.

Retail \$1,050.00

Available at your local hobby store.
or from

Pacesetter Products, Inc.

For more information send \$2.00 to:



Owners Tech-line (714) 927-6279

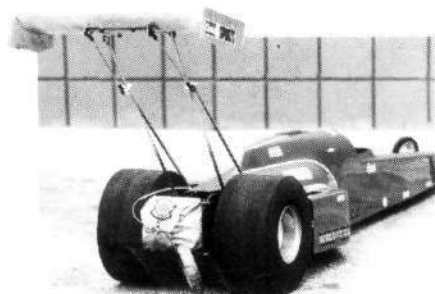
930 WEST HYDE PARK BOULEVARD • INGLEWOOD, CALIFORNIA 90302 • (213) 677-0259

What's New



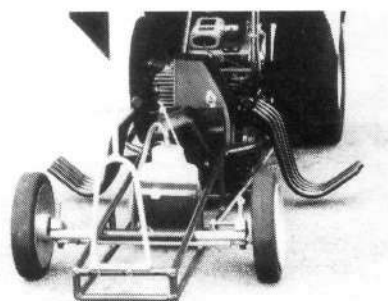
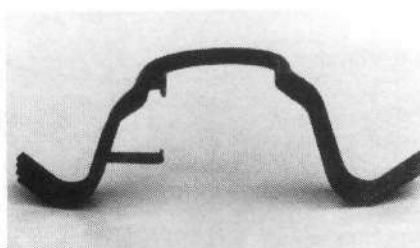
FERRARI TESTAROSSA

A true-scale model of the famous Italian sports coupe. Designed for two or more channels. This sophisticated chassis, with full-independent double-wishbone suspension, progressive-rate coil springs, six oil-filled shock absorbers and differential transmission give you the high performance and finely balanced handling you would expect in a robbe (180 Township Rd., Belle Mead, NJ 08502) Ferrari Testarossa. The highly detailed injection-molded body work, with retracting headlights and factory-finished parts, in keeping with robbe's high standards to insure easy assembly.

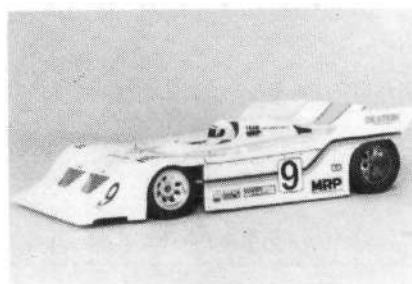


NEW FROM PACESETTER

Pacesetter Products, Inc. (930 West Hyde Park Boulevard, Inglewood, CA 90302) releases the first in a series of safety equipment for the Eliminator and Vaporizer. The real working Parachute is the first of its kind made by Filler Safety Equip., a N.H.R.A.-approved company. The Filler Parachute comes with all brackets and hardware needed to be installed on your Eliminator and Vaporizer and will help stabilize the car at 60 to 100 miles per hour.

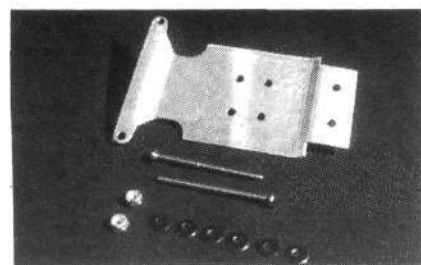


Pacesetter's new Speed Equipment line includes a real working header from Jose Vilasenor of Headman Headers. This precision-tuned header will improve ETs by 15% and increase horsepower by 1/2 horsepower. On the 2.3- or 4-horsepower Quadra engine for the Eliminator and Vaporizer.



NEW FROM MRP

The MRP (142nd Ave. N.E., P.O. Box 647, Woodinville, WA 98072) 1/10-scale Can-Am body is the choice of champions in 1/8-scale on-road racing. This outstanding handling body is now available in 1/10-scale. The superb road-holding and quality that make the body work so well in 1/8-scale road cars also make it an excellent choice for 1/10-scale road cars. See this body at your dealer today (No. 30-1125).



FALCON REPAIR KIT

Team Pit Stop (15460 S.W. 256 St., Miami, FL 33032) announces a Falcon front end repair kit for the three most commonly broken parts, using the old pieces. Kit repairs the front bumper/skid plate bracket, lower front end mounting brackets (which mount to front of tub), and the four front tub corners.



MODIFIED OVAL RACER

Raco Modelcraft (1400-C East Saint Andrews Place, Santa Ana, CA 92705) has announced their brand new Supermodified. Designed and ideally suited for oval-track racing, their new giant has already won major events all around the country during the '86 season, including the prestigious Las Vegas Speedweek open wheel championships for quarter-scalers. Available in dirt or pavement configuration, the car includes a high-performance exhaust, specially jetted carb, wings, chromed-steel roll cage and side nerf bars. With these additions, the Supermodified develops over 1.5 horsepower from its Zenoah 23cc engine and is capable of 50- to 60-mph straightaway speeds while handling an oval track's turns as if on a string. Independent suspension and oversize oil-filled shocks make for the ultimate in handling on the roughest and toughest dirt or pavement ovals. Recoil starting, high-load servos, dual disc brakes and automatic clutch are a few of the features included in the pre-assembled car kit. One hour of final assembly and your two-channel radio gear are all that's needed to complete this car.



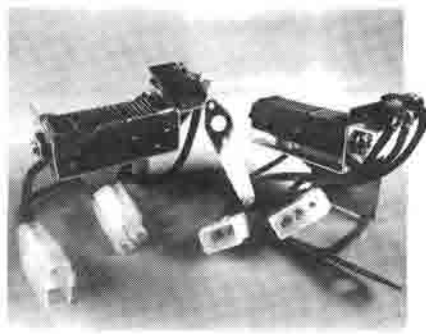
PLATINUM SERIES

The new Platinum Series Motor from Team Checkpoint Motors (657 W. 19th St., Costa Mesa, CA 92627) features an endbell and rear can assembly made of 20-24 aircraft-quality aluminum. It's almost 1/16-inch smaller than conventional motors and lighter as well. The magnets are ceramic No. 8, versus No. 5 for Japanese motors, which provides extreme torque as well as good braking-effect even when the brakes are "dialed out" of the car. The price will be comparable to that of other motors—and best of all, it's made in the USA!



NEW FROM BOLINK

Let the good times roll with BoLink's (420 Hosea Rd., Lawrenceville, GA 30245) The Classics, '55 Chevy body. Available in 1/10-scale and 1/12-scale. The '66 Mustang fastback is another one of the latest additions to The Classics.



RESISTOR SPEED CONTROL

No expensive electronics to fail you. If something wears out, you can repair it. Variable forward speeds, braking and constant-speed reverse. Fits all BoLink as well as many other 1/10-scale cars, Part No. 4620, 4620-A respectively. Write BoLink R/C Cars (420 Hosea Rd., Lawrenceville, GA 30245).



SPIRIT OF AMERICA

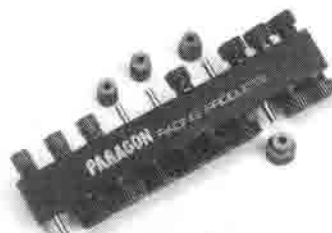
Bob Shattan Associates has just introduced its Spirit of America off-road R/C car to the hobby industry. The racing machine is ready to run and includes features normally found on R/C cars selling for more than twice its cost. Features include: variable speed, proportional steering, rear differential, fully independent front suspension, swing rear-axle suspension, extra-wide pneumatic tires, 100-foot range, functioning headlights and horn, indestructible nylon bumper, trim control, and limited one-year warranty supported by a complete parts back-up program. The Spirit of America is marketed exclusively to the hobby trade by Star Enterprises, Inc. (P.O. Box 170, Deerfield, IL 60015).

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by Radio Control Car Action, nor guarantee of performance or safety by Radio Control Car Action. When writing to the manufacturer about any product described here, be sure to mention that you read about it in Radio Control Car Action.



NEW FROM PARAGON

The Paragon Formula 1 is a superior, high-quality blend of solvents designed to rid your electric motor of foreign particles and brush deposits thereby increasing power, performance and motor life. Distributor and dealer inquiries are invited: Paragon Racing Products (Dept CA, 8802 Knollwood Dr., Eden Prairie, MN 55344).



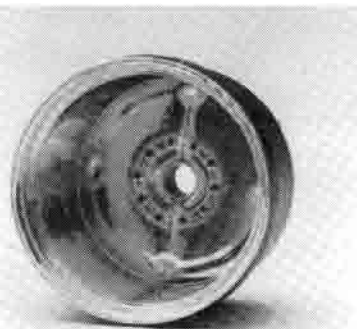
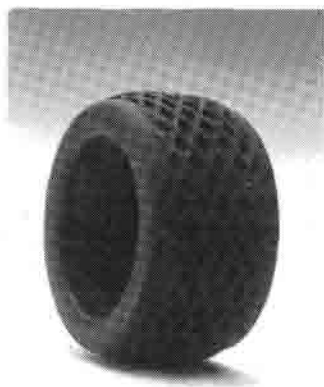
The Paragon Gear Caddy is an innovative device for keeping track of 32- and 64-pitch gears. The caddy mounting pins are numerically arranged to allow the racer quick and easy access to the gear desired. Also comes with custom number decals (8 through 37) for labeling the caddy.



SHOOT-OUT CHAMPION!

Let the results speak for themselves. At the 2nd Annual Shoot-Out in 2WD Stock, Trinity motors finished first, third, fourth, seventh, and tenth. For more information contact Trinity (1901 E. Linden Ave., Linden, NJ 07036).

What's New



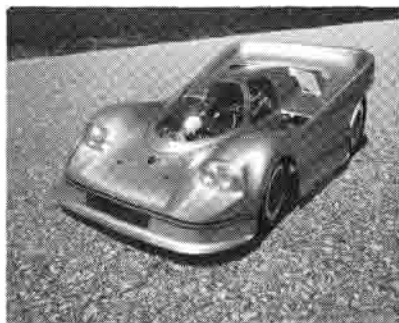
THE WARRIORS!

From Pro Line (P.O. Box 45, Beaumont, CA 92230) comes the great look of a wide tire with the surface area of a small tire. Extra-wide, low-profile tires cause less friction and give you more speed than other big tires. The Warrior line includes the 426 Apache for sand, 427 Cherokee for hard surfaces (waffle-style) and 428 Comanche for hard surfaces. The Big Bear Chrome Wheel (shown) allows your bear to romp in style.



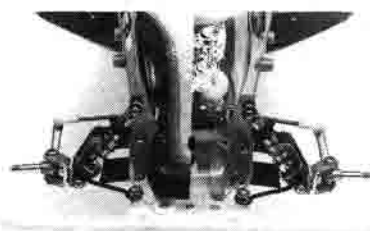
PIC METAL MAX

A four-in-one advanced product, Metal Max from Penn International (943 Stierlin Rd., MT. View, CA 94043) offers the following advantages: 1) conditions commutators and speed control contacts 2) acts as an after-run agent for fuel- and gasoline-burning, two- and four-strokes 3) acts as a model railroad layout conditioner and track cleaner and 4) is a corrosion-inhibitor on bearings, bushings, fasteners, battery packs, and connectors. Sold in 1-ounce bottles with dropper control dispensing tip.



GT-110 BODY FOR FROG

Fast Lane Exotics, Inc. (9973 S.W. 155th Street, Miami, FL 33157) enters the R/C market with the 1/10-scale GT-110 Lexan body. Designed specifically for the Tamiya Frog chassis, it will fit other 1/10-scale on- and off-road chassis. This is the first body that allows owners of these popular off-road cars to convert to the street in true race car style. Features include headlight buckets which can be made functional. For more info contact your local hobby store or Fast Lane.



NEW FROM CRP

The Frog/Brat front shock kit from CRP (3250 El Camino Real - B3, Atascadero, CA 93422) adds fully adjustable coil-over shocks to your Frog or Brat. Fine-tunes your front suspension for smoothness and stability. Comes complete with shocks, mounts, and hardware. Bolts on; no modification is necessary.



CRP Bearing Oil is used to lubricate ball bearings and other moving parts. There's less friction, and less wear. Handy 2/3-ounce bottle fits easily into tool box.



STARR AIRBRUSH

The Starr Enterprises (560 Juneberry Riverwoods, IL 60015) Model 150 modeler's airbrush is siphon-fed and uses a color cup and 22cc or 60cc paint jars. The tip allows duplication of almost any prototype color pattern in miniature. The 150 is packed with two paint bottles, color cup, paint tip cap, air hose, storage hang-hook, servicing wrench and regulator for compressed air bottles.



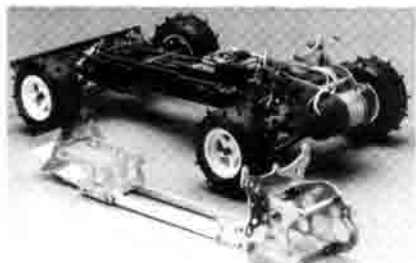
OPTIMA CHAIN TENSIONER

The ultimate option for your Optima or Turbo Optima: it will prevent gear box damage and chain breakage, increase speed and running while reducing weight. Ask for it at your local hobby shop; from Performance Race Products (690227 West D-7, Tacoma, WA 98466).



KYOSHO CAR AIDS

This is an essential set consisting of 150 screws, 50 nuts and 20 washers. Great for any electric buggy and comes in a handy snap-tight plastic case. The Kyosho Option House accessories are distributed to leading retailers nationwide by Great Planes Model Distributors (P.O. Box 4021, Champaign, IL 61820).



Kyosho also introduces the Celebration Chassis Set containing all of the main chassis parts of the Optima, Turbo Optima and Javelin cast in beautiful gold-anodized aluminum. Also available is the undrilled High-Carbon Plate to replace the radio plate of the same cars. Because it's made from carbon fiber and epoxy, it's super strong yet lightweight. Available in 1.7mm and 2.5mm thicknesses.



RACE CASE

The Race Case from Sticky Group Int. (20130 State Rd., Cerritos, CA 90701) is large enough to hold an assembled car; has handy compartments for transmitter, chargers, extra batteries, tires, wheels, and radio components; has lockable latches, heavy-duty solid wood construction covered with burgundy imitation leather and is made in the US. The bottom compartment separators can be made from 3/16x3-inch balsa glued in with Zap-A-Gap. Tools, tires, plastic hardware boxes can be stored here. The Velcro lid latch locks the compartment shut and also holds it open. With the lid down, it becomes a work table.



12L LITESINK

Designed to be a direct replacement for the plastic motor mount, the 12L from Litespeed R/C Performance Products (P.O. Box 4765, Spokane, WA 99202-0765) offers over 12 square inches cooling area. The 12L is machined from 6061 T6 aircraft-quality alloys, and tolerances are held to plus or minus .05 overall and plus or minus .001 in the ride-height adjustment slot. All the Litesinks are anodized to prevent electrolytic interaction. Litesinks offer a method to cool their motors for longer running times.



PARMA'S LATEST

The Positive-lock differential from Parma (13927 Progress pkwy, North Royalton, OH 44133) fits the Optima, Turbo Optima, Javelin and Salute. It replaces the original bevel gears, eliminating breakage point and uses one-way clutch roller bearings to give more positive steering response.



Parma's newest body, a 1/12-scale Lola T-900 reproduced in clear Lexan, is a replica of the car that was used in the '85 Cart Championship by Mario Andretti.



Track Adjustment Wheels for Parma fit 95% of available 1/10-scale off-road cars. By changing the attaching positions of the main rim and central hub, four different track widths can be obtained. The 2-inch rim can be mounted with either sponge or rubber hot-shot-size tires.

Track Directory

ALASKA

ARCORR
(Alaska Radio Controlled
Off Road Racers)
4970 Fairbanks St.
Anchorage, AK 99515
Contact: Tim Brass, President 278-4250

AROARA
(Alaska Radio Operated
Auto Racing Association)
1/10 Scale Racing Series
4970 Fairbanks St.
Anchorage, AK
Contact: Bob Peters 345-3269

AROARA
1/8 & 1/12 Scale Racing Schedule
4000 Credit Union Drive
Anchorage, AK
Contact: Bob Peters 345-3269

ALABAMA

**SOUTHEAST ALABAMA R/C
AUTO RACERS**
111 Foxfire Dr.
Dothan, AL 36301
Woody Trimble (205) 793-1849

ARIZONA

ESCALANTE RACEWAY
10505 East Escalante
Tucson, AZ 85730
(602) 298-1253

SCALE RACING SPORTS
1120 N. Hayden Rd. SCC Tempe, AZ
85281
(602) 829-9117

CALIFORNIA

AA R/C RACEWAY & HOBBIES
Sandhill Ranch
Brentwood, CA
(415) 757-6594

ANTIOCH R/C RACEWAY
5631 W. Lone Tree Way
Antioch, CA 94509
Contact: Jack Hanson (415) 754-5700

**CALIFORNIA STATE
CHAMPIONSHIPS
INDOOR CARPET SERIES**
Frank Hill & Assoc.
560 E. Providencia, Suite 11
Burbank, CA 91501
(818) 845-1664

ELECTRIC OFFROAD RACEWAY
1801 Springs Rd.
Vallejo, CA 94590
(707) 557-0302

HOBBY BENCH RACEWAY
515 S. Glendora Ave.
Glendora, CA 91740
(818) 963-9517

MARYSVILLE R/C RACEWAY

(Formerly GOLDEN T
R/C RACEWAY)
11th & Ramirez St.
Marysville, CA
(Not a mailing address)
Contact: Harry Jackman (916) 671-6677

NAVAL TRAINING CENTER
San Diego, CA
Contact: Linda Jones (619) 225-5160

NOR-CAL MINI OFFROADERS
2665 Park Marina
Redding, CA 96001
(916) 241-3737

ORCA CENTRAL DIVISION
Cycle Arts Racing
3188 N. Marks, #121
Fresno, CA 93711
(209) 233-3665 or (209) 229-9366

ORCA
P.O. Box 8938
Calabasas, CA 91302
Contact: Lou Peralta (818) 340-5750

PETERBUILT JR. RACEWAY
1261 Lick Ave.
San Jose, CA 95110
Contact: Peter Liu (408) 279-0111

RADIO CONTROL RACE CENTER
18240 S. Vermont Ave.
Gardena, CA 90247
Contact: Cliff & Rhea Fisher (213)
324-3105

**RADIO CONTROLLED
HOBBIES RACEWAY**
2011-B Placentia Ave.
Costa Mesa, CA 92627
Contact: Ron Williams (714) 631-1555

RANCH PIT SHOP - POMONA
1655 East Mission Blvd.
Pomona, CA 91766
(714) 623-1506

R/C SPEED WEEK
P.O. Box 411
Woodland Hills, CA 91365
(303) 431-8868

WORLD CHAMPIONSHIPS
Ranch Pit Shop
1655 Mission Blvd.
Pomona, CA
(714) 623-1506

SCAR
1904 S. Ross
Santa Ana, CA 92707
Steve Hickman, President

T.Q. HOBBIES
1358 Pacific Coast Hwy.
Harbor City, CA
Contact: Bruce Berteau (213) 539-3611

MHOR R/C RACEWAY
15540 E. Batavia Dr.
Aurora, CO 80011
Contact: Jess Brockman (303) 343-0151

R/C DIRT WORLD/AA HOBBIES
1801 South College
Fort Collins, CO 80521
(303) 493-7199

SOLANO R/C DIRTBURNERS

Gregory Street
Fairfield, CA 94533
Contact: Charles Johnson
(707) 429-0238

COLORADO

QUEEN CITY R/C RACEWAY
5050 S. Federal Blvd.
Centennial Shopping Center, Federal &
Bellview
Englewood, CO 80150
(303) 730-1391

CONNECTICUT

B.O.R.R.A.
Bethel R/C Off-Road Racing Assoc.
1/10 off-road racing series
Bethel, CT
(203) 744-2934

DELAWARE

AUTO DERBY RACEWAY
RD 142
Kenton, DE 19938
Contact: Tom (302) 734-5675 or
Dan (302) 653-5088

FLORIDA

**FLORIDA ELECTRIC
AUTO RACERS**
420 Charleswood Ave.
Orlando, FL 32825
Lance Reynolds: (305) 282-8540

F.A.R.C.A.R.
6596 NW 26th St.
Sunrise, FL 33313
Mike Morse: (305) 748-5416

**FORT LAUDERDALE
R/C SPEEDWAY**
N.W. 15th Ave.
Fort Lauderdale, FL 33313
(305) 472-1032

**MIAMI AUTO RADIO CONTROL
CAR ASSOCIATION**
129 Ave. and S.W. 6th St.
Miami, FL 33184
Contact: Richard or Nilda Carreras,
America Hobby Center, (305) 554-5505

**LET'S RACE AMERICA
RENTAL SPEEDWAY**
1030 W. State Rd. 434
Longwood, FL 32750
Contact: Bruce Fallon (305) 834-7888

**WEST COAST RADIO
CONTROL CLUB**
3906 Bay Villa Ave.
Tampa, FL 33611

D AND D RACEWAY, INC.

2322 Hibiscus Dr.
Edgewater, FL 32032
**FLORIDA STATE 1/12
SERIES SCHEDULE**
11850 Nortrall Ave.
Tampa, FL 33617
Contact: Eric Guder (813) 985-6158

**LAKE WHIPPOORWILL
INTERNATIONAL SPEEDWAY**
12345 Narcoossee Rd.
Orlando, FL 32812
Trackside: (305) 277-9586
Campground: (305) 277-5075

GEORGIA

BOLINK RACEWAY PARK
420 Hosea Road
Lawrenceville, GA 30245
Contact: Bob Rule (404) 963-0252

PDQ RACEWAY
1869 Flatrock Rd.
Stockbridge, GA 30281
Jack Bailey: (404) 474-1123

HAWAII

**HAWAII RADIO CONTROL
ELECTRIC CAR CLUB**
1423 - 10th Avenue
Honolulu, HI 96816
(808) 737-9582

ILLINOIS

RACEWAY HOBBIES, LTD.
80 E. Main St., Rt. 22
Lake Zurich, IL 60047
Bill Palermo: (312) 438-0460

HOBBYTOWN
4915 W. Rte. 120
McHenry, IL 60050
Luke Herring: (815) 344-1777

**N.I.R.O.C.C.
NORTHERN ILL. RADIO
OPER. CAR CLUB**
476 N. East River Rd.
Des Plaines, IL 60016
Dennis Moscatelli: (312) 827-2187

SSRCCC
(South Suburban Radio
Control Car Club)
510 Ingraham
Calumet City, IL 60409
(312) 891-0089/474-7802

BYRON AREA RADIO RACERS
800 River Dr.
Byron, IL
Contact: Jim Haynes (815) 234-5615 or
Bob Falk (815) 234-5183 or Mickey
Tate (815) 734-7239

TEEN TOWN
105 N. 13th
Herrin, IL

Race Track Owners: Do you want to attract more racers to your track? Then let them know where you are by listing your name and location in our "Race Track Directory." Each issue **Radio Control Car Action** will publish a listing free (space permitting) of the race tracks around the country. To join in, send your name, address, and telephone number, along with the name of a person to contact for more information, to "Race Track Directory," **Radio Control Car Action**, 632 Danbury Rd., Wilton, CT 06897.

HOBBY CONNECTION RACEWAY
925 N. Lynhurst
Indianapolis, IN 46224
Contact: Carl Gilbert (317) 247-5702

INDIANA

**BREMEN BANDITS R/C
RACING CLUB**

BREMEN HOBBIES
308 N. Bowen
Bremen, IN 46506

GONZO RACEWAY
Chesterton, IN
Contact: Jeff (219) 926-4341
or 736-7414

**GOSHEN R/C OFF ROAD
RACING CLUB**

Tim's Hobby Shop
1922 Elkhart Rd.
Goshen, IN 46526
(219) 534-1992

MIDDLEBURY R/C CLUB
Flying High Hobbies Haus
304-A N. Main, Middlebury, Ind. 46540
Contact: Steve or Sharon Mattern
(219) 825-2128

IOWA

IORC

(Iowa Offroad Racing Club)
P.O. Box 22052
Des Moines, IA 50322
Contact: Ron Boone (515) 987-1184

KENTUCKY

THE SPEEDROME

3451 Cane Run Rd.
Louisville, KY 40211
Wanda: (502) 778-7313

RALPH'S RACEWAY & HOBBY

227 Georgetown St.
Downtown Lexington, KY
(606) 252-1809

LOUISIANA

**PERFORMANCE HOBBY
RACEWAY**

8308 Lafitte Ct.
Chalmette, LA 70043 (Behind Wendy's)
Guy Trentecosta: (504) 279-5158

MARYLAND

**BALTIMORE ROUGH RIDERS
OFF-ROAD R/C CLUB**

2800 Pelham Ave.
Baltimore, MD 21213
Contact: Rick Gondeck Sr. 488-8615

DOUG'S HOBBY SHOP RACEWAY

Rt. 301, Box 96-C
Waldorf, MD 20601
Bill Holley: (301) 843-6220
or Patrick Gunn: (301) 843-7774

KING'S R/C CARS

219 East Washington St.
Hagerstown, MD 21740
(301) 739-0080

DUSTBUSTERS R/C CLUB

5004 - 70th Place
Hyattsville, MD 20784
Contact: Jeff Swartz (301) 773-7230

MASSACHUSETTS

**CUSTOM MODEL
PRODUCTS SPEEDWAY**

1 Bert Dr.
West Bridgewater, MA 02379
Contact: John Smith (617) 580-1622

HOBBY CITY

263 Lynnfield St.
Lynn, MA 01904
Steve: (617) 581-7361

**MASSACHUSETTS SCALE
AUTO RACERS**

Holyoke, MA
Rick Pepin: (413) 736-7711

NEW ENGLAND

OFF-ROAD RACERS

Bill's Hobbies Raceway
600 N. Main St., Rte. 83
E. Longmeadow, MA 01028
Rick Pepin: (413) 736-7711

MICHIGAN

**REMOTE CONTROL
USA RACEWAYS**

6083 Dixie Hwy.
Bridgeport, MI 48722
Contact: (517) 7777-USA

YMCA R/C RACERS

315 W. Main St.
Niles, MI 49120
Contact: Paul Cooper (616) 683-1552
or Ric Clingaman (616) 683-3075

FLINT R/C CAR CLUB

Flint, MI
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ASSOCIATED RC12L

(Continued from page 128)

are two reasons for this. First, the electronic speed controller is fast in response and very small, besides which you won't fit anything else in its place. Second, there isn't enough room for anything else but the mini radio and electronic controller. Make sure to check this out before you dive in.

I used the Airtronics* 500 speed controller mated to a micro radio with micro servo. The combination worked well, allowing the installation to go smoothly. The Airtronics 500 is one of the best-handling speed controllers I've used. It's compact, yet can handle a whopping 75-

amp surge. For this job, no sweat.

The RC12L comes without a body, so I chose the Associated TOJ Can-Am body. A slick design in anyone's book, the TOJ is used by more championship drivers than any other type. I used Pactra Racing Finish paint in Pearl Purple and Racing White, backed with metal-flake gold for a good-looking combo.

PERFORMANCE. On easing on the throttle, the 12L moves out briskly and smoothly. This is great but not where I wanted to be, so I punched the throttle wide open. I was not disappointed.

The first thing I noticed was that the 12L floats on the road. The suspension works well, taking the little bumps unnoticed and the bigger ones with only a

slight rise in the body. There are no harsh "whappity" noises to be heard. It holds the straight line well, and here is where I found out about the steering authority.

The 12L has lots if it. Even with the transmitter dual-rate dialed all the way down, the wheels move a lot. You really have to be careful in the steering department with the 12L. Once mastered, you find that the car handles quite nicely. On carpet, the 12L is deadly. It loves to race carpet tracks, taking anything you can throw at it with little complaint and good response. Again, the steering becomes apparently touchy, but you'll master it quickly, soon learning that it actually gets you out of certain tight spots when

(Continued on page 140)

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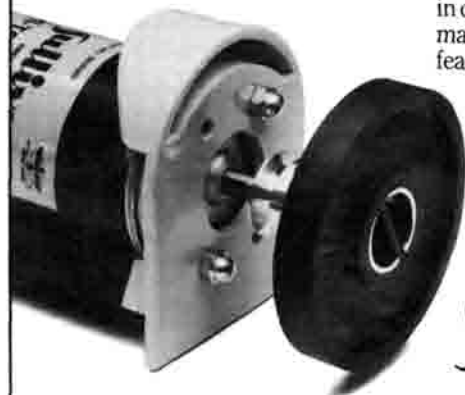
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1/12 CHAMPS

(Continued from page 140)

Now for the really fast guys: the Expert class. We're talking about a group of drivers with half the national title holders among them. Included were Tony Neisinger, the current world champ; Kent Clausen, a former world champ; Rick Hohwart, a national champ; and about a dozen other guys who could be world champs on any given day.

The B Main began with Mace Horowitz taking the early lead with 7 cars chasing him. Mace held on for quite some time, but made a fatal mistake which let the whole pack right by him. Miles Cook took over from here and ran like the devil. Miles wasn't about to make the same mistake as Mace, and opened up a sizable lead by the 5-minute mark. Tom Bowlin entered the fray, taking second a while and holding on. Grant Johnson was waiting around for an opportunity to come his way, and at the 7 1/2-minute mark, it did. Grant wasn't even in the lead pack, when Mace dumped the batteries, and Bowlin ached a dot and began to dump. So with less than a minute remaining, Grant found himself looking at a second-place trophy. He succeeded, trail-ing Cook by just a lap. In third was Bowlin.

Before getting into the A Main, let me tell you about the scoring system. The scoring was done electronically by the BoLink/AMB computer system. This racing computer features miniature transmitters placed in each car which trip a signal every time the car comes across the finish line. It cuts down a lot on the counting chores done by the race officials. The computer not only tracks the laps, it also records the lap times, and positions as the cars progress. Many thanks to BoLink. Sponsors included Sanyo Batteries, Checkpoint Motors, and of course, *Radio Control Car Action*.

The winners in the Concours beauty contest were Kent Clausen in first place, Dave Cochrane in second, and Jayson Thompson in third. Sorry, folks, but the photos don't even begin to do justice to these cars.

Now for the fastest of the fast. Remember that upon entering this race, Kent Clausen had already sewn up the series title with two previous wins at San Diego and Ventura. This race would be akin to a triple crown win for Clausen.

Watching these guys prep their cars for the race was almost boring they were so methodical. First, they'd inspect every little item, and fix what needed fixing, time and time again. Then, they'd roll the cars on the track to make sure the

steering was correct. After a 10 minute prep ritual at the line, the drivers and cars were ready, and the starting tones blared out!

Clausen wanted to make that third win a reality. He jumped into the lead from turn one. Hot on his tail was Tony Neisinger and Shawn Ireland. Only 20 feet behind them was the last-place car.

At the minute mark, Ireland ate a dot and Kevin Mercadante jumped into third behind Neisinger. The leaders were setting a blistering pace, faster than the top qualifying times. At about 3 minutes, Mercadante blew it and Rick Hohwart stepped right in, Clausen still had the lead.

A minute later, disaster struck for Clausen. Steaming into the third corner he clipped the dot, allowing Neisinger and Hohwart to drive through. Clausen recovered quickly, aided by the lead cars hitting heavy traffic. Thirty seconds later, the top three cars were only 10 feet apart.

Hohwart was scrapping for the lead, and at about the 5 minute mark, he took it from Neisinger, opening up about a 20-foot lead. It remained that way for 2 more minutes; three cars all battling for the lead, and not a speck of room for error. But, disaster struck once again, and this time the victim was Hohwart.

At the 7½-minute mark, a back marker took out Neisinger for a moment, allowing Clausen into second place. Hohwart thought he had room to breathe, but became the next victim. His batteries went south on him just 30 seconds short of victory, Clausen blew by him with Neisinger on the trail.

It looked pretty good for Clausen with only seconds remaining. But no dice. Clausen dumped only 15 seconds shy of the finish, a mere two laps. Neisinger zipped by and nailed the coffin shut.

Tony Neisinger picked up the win, Shawn Ireland took second, and Mercadante took third. A dejected Clausen finished fourth by coasting across the line.

This was one of the finest races I've ever seen. Never before had I seen so many cars go so incredibly fast and stay so close together for 8 minutes time. It was spectacular! The intensity of the battle was written all across Neisinger's face. Tony was visibly exhausted, but proud to be the winner.

No doubt about it, the California State Championships Series was one demanding series. There were top-caliber drivers giving it their all and convincing this writer that there's genuine world-class talent in abundance out there. Mark my words, the next world champ will be one of these hard-charging, gutsy California drivers—you can bet on it!

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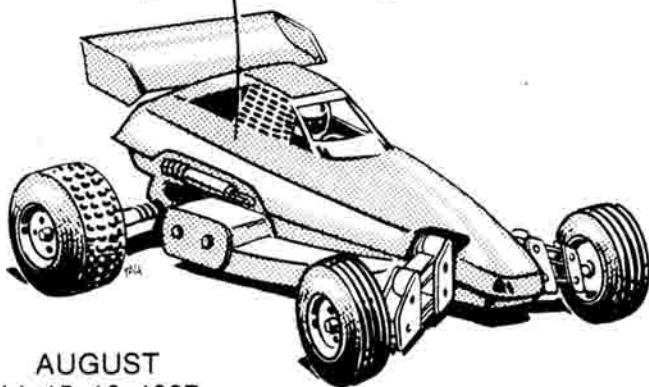
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